

Exploring the Effectiveness of Neural Network Therapy[®]

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Student Researcher: Michaela Riopelle

Host Organization: Canadian Family Health Counselling

Host Contact: Kim Sargent

Affiliation: FRSC4890Y

Faculty Supervisor: Dr. Joel Cahn

Trent Community Research Centre Coordinator: Ryan Sisson

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Abstract

This research project assessed the effectiveness of Neural Network Therapy (NNT[®]), an alternative emotional health care tool created by Canadian Family Health Counselling (CFHC). This organization hypothesised that NNT[®] creates positive behaviour, mood, and lifestyle changes for its clients in terms of nutrition, fitness, relaxation, relationships, education, career, and contribution. This hypothesis was tested with a survey distributed to 857 CFHC clients over the age of 16 years old who had participated in at least five NNT[®] sessions. This survey incorporated quantitative analysis by using the CORE-OM self-report psychological distress measurement scale, and qualitative analysis through a series of open-ended questions pertaining to lifestyle changes post-therapy. The Emotional Health Practitioners (EHPs) at CFHC were also interviewed qualitatively with open-ended questions regarding their professional experience, opinions, and comparisons of NNT[®] to traditional therapy models, like Cognitive Behavioural Therapy (CBT). Results supported the CFHC hypothesis as the majority of clients showed positive change in their behaviour, mood, and lifestyle post-NNT[®]. The CORE-OM tool proved to be an effective method of quantitatively measuring the client's psychological distress post-NNT[®]. It indicated that the majority of CFHC clients experience a healthy-low level of distress post-therapy. Moreover, it suggested that CFHC clients experience less challenges and possess healthier states of well-being and functioning compared to clients post-CBT. Additionally, while nearly half the clients entered NNT[®] in a state of despair, the majority of clients completed NNT[®] with a sense of appreciation. In terms of the nine lifestyle focus areas, the most abundant improvement was found in terms of contribution (spending personal time and effort towards health, wellness, relationships, and the community), and the least in terms of fitness. The majority of clients stated that the changes in these nine areas were realistic and sustainable long-term. Because of this, 86% of the clients recommended that other community members engage in NNT[®]. In regard to the comparison between NNT[®] and CBT, both models are perceived to be effective, although the optimal target client differs. NNT[®] is better suited to those in need of an engaging, approachable, and short-term psychoeducational therapy with the goal of forming a balanced lifestyle in addition to a healthy mind. Alternatively, CBT is appropriate for those in need of consistent, long-term, and structured therapy with a focus on challenging dysfunctional thoughts to improve mental health. Further research should be

conducted to assess the effectiveness of NNT[®] towards depression and anxiety specifically, as these were major reasons that clients sought counselling.

Introduction

In order to assess the perceived effectiveness of NNT[®], an emotional health care therapy model, it is vital that its scientific framework be understood. This therapy's methodology focuses on implementing gradual changes to the human brain through the repetitive learning and practicing of interactive exercises. These changes to the human brain can be measured through the clients' moods, behaviours, well-being, and lifestyle habits. In order to understand how these emotional changes are solidified, it is vital that the development, functioning, biological components, and history of the human brain be understood.

The understanding of how the brain and its components work has vastly changed over the past century. Historically, it was understood by scientists who study the nervous system, that the neurons an individual is born with is their finite supply for life (1). It was believed that these nerve cells could not be replaced by new ones if damage or cell death occurred (2). Understanding this concept is important because neurons hold great responsibility and power in the human body. They are the information messengers of the brain telling people how they should move, feel, react, survive, and communicate (3).

On either end of their nerve cell body, neurons have an axon which transmits signals away from the cell to other neural regions (3). On the same end there is also a dendrite which contains branches that receive the signals coming into that neuron (3). The information messaging system works when neurotransmitters, or chemicals in the brain, are sent through spaces known as synapses (3). These synapses allow the messages from one neuron to transfer along the axons and dendrites of other neurons (2). Essentially, this allows the brain to communicate among the different sections of itself and then from itself to the other components of the central and peripheral nervous systems (3). These connections and signals ultimately wire one's brain. The circuits define the individual's planning and behavioural tendencies (4). The issue with the historical view of the nervous system is that if these circuits are permanent and finite, the person's behaviour and emotions will be too. This results in the sensory and motor functions of the individual being preconceived at early developmental stages. Once development is finalised, there is no room for further neural alteration in the brain.

Although controversial, many neuroscientists now refute the historical concept that new neurons cannot be generated after initial development (5). Neurogenesis, the birth of new neurons in an adult brain, is now widely supported in the field (1). Researchers have discovered that with neural stem cells, new sensory, motor, and interneurons can grow and integrate themselves into the prewired circuits of the adult brain (3). This neural cell growth is now understood to occur in two regions of the brain (1).

Firstly, neurogenesis occurs in the dentate gyrus, a part of the hippocampus (4). The hippocampus is a key piece in allowing individuals to learn as well as develop their spatial memory (6). It allows individuals to store memories and then revisit them in the future (7). In many cases, specific memories are triggered by a stimulus that allows them to be retrieved from the hippocampus (7). The second location that new neurons can be generated in is the old brain, or amygdala (6). The amygdala is linked to the hippocampus as it is what connects certain emotions to the specific memories (7). The amygdala determines whether an encounter, experience, or memory should produce a feeling of fear, dread, anxiety, or despair (6). Once the connection between the emotion and memory is constructed, it can be repeatedly triggered within the individual's brain, exposing them to the feeling over and over. The amygdala determines an individual's instinctual reaction to stress or intense emotions (8). When threatened, it sends a signal to the hypothalamus (9). The hypothalamus holds neural networks that integrate sensory signals from the peripheral nervous system to control basic life functions (10). It dictates whether the peripheral system will activate the involuntary autonomic sympathetic nervous system (10). If the hypothalamus deems the situation to be threatening, it will send signals to activate the sympathetic nervous system. At this point the body transfers from its calm "rest or digest" status to its emergency "fight or flight" mode (9). This status makes the body unconsciously produce adrenaline to increase sweating, heart rate, shorten breaths, and secrete stress hormones like cortisol (9). This response cannot be thought through or controlled, rather it is the amygdala taking over and deciding the course of action. This series of events is harmful to an individual because the unconscious "fight or flight" mode can become extremely habitual. If the body senses a trigger whether that be stress or by retrieving a memory from the hippocampus, the amygdala will alert the sympathetic nervous system to take over and move into a state of emergency. These triggers can be as small as thinking of a test in the near future, or larger such as getting into a car accident. If these negative emotional responses are repeated frequently, the

individual can develop a sense of helplessness. Their mental and physical health can worsen substantially by constantly living with increased levels of stress (9).

Researchers emphasize the importance of the connections between the amygdala, the old brain, and the prefrontal cortex, the new brain (7). It has been observed that the prefrontal cortex has an extinction effect on the stress triggers (7). The new brain can lessen the intensity of fear, despair, anxiety etc., by breaking down the emotion-memory association (7). If the stimulus, whether that be a memory or thought, is rerouted to a new emotional response, the detrimental “fight or flight” response can be avoided, and the new brain will be activated (7). The prefrontal cortex can take charge to examine the situation. In most cases the matter is not whether the individual will survive or not, and therefore the alert response is not necessary (11). Rather, the new thinking brain can calm the body down and take conscious control of the fear, despair, anxiety etc. and dissipate it (7). According to modern neuroscience experts, this provides the brain with a voluntary option to choose from when stress is encountered (12). If survival is threatened, the involuntary reaction should proceed, whereas for the majority of situations, the individual should consciously attempt to control their reaction and response (11). By training the brain to choose the conscious response when faced with anxiety, it will become habitual (11). The old brain will be used less and less which dually means the “fight or flight” response will retire. This will allow the individual to feel in control so that rather than a stimulus sparking a negative emotion, it will spark a positive chain of thought. With repetition, the unwanted emotions will eventually be disassociated from the trigger. This will enable the individual to feel at ease and be freed from the traumatic response that once caused them stress (11).

This method of rewiring the brain was coined by the term Neural Network Therapy (NNT)[®] (11). Kim Sargent, the founder, and director of Canadian Family Health Counselling, created a practical method to alter the neural networks in an individual’s brain by practicing specific exercises that she developed (11). These exercises teach those struggling with their stress responses how to consciously choose their thinking brain rather than their automatic brain. They teach individuals how to respond to pressures with calm, positive, and purposeful critical thinking patterns rather than with the irritability, anxiousness, sadness, grief, and anger that can seem like the more natural response. By practising these exercises, the new thought patterns will become natural and wired into their brains as a neural network habit (11). The discovery of neurogenesis propelled the creation of this method. It allows for neuroplasticity, the remodelling

of the brain, to take place for the participating clients (11). This allows the individual to feel positive emotional responses in their daily life and move past their emotional struggles. This organization created NNT[®], a modern emotional health care tool, as an alternative to traditional talk therapy (11).

It is hypothesised that NNT[®] can successfully improve the emotional health of clients. The purpose of this research project is to test this hypothesis and determine if NNT[®] has been an effective therapy method for clients of CFHC to date. The organization solely provides this method of therapy to its clients, and therefore wants a clear determination of its impact on client emotional health. It will be considered effective if its exercises can create positive behaviour, mood, and lifestyle changes for the clients at hand in terms of nutrition, fitness, relaxation, family, relationships, friends, education, career, and contribution. These positive changes can be seen as progressive steps to a preferred “Energy of Emotion”. “Energies of Emotion” are measured on a scale of least desirable to most desirable (11). The scale starts with the feeling of despair (the least desirable) and moves to shame, then guilt, fear, anger, frustration, and finally it ends with the most desirable feeling, appreciation (11). The therapy’s goal is to gradually alter these undesirable energies into a sustainable sense of well-being. Clients were qualitatively asked to indicate their new lifestyle implementations regarding the nine focus factors as well as their emotional status after completing the NNT[®] exercises. They demonstrated their opinions through a survey. Each client’s level of psychological distress post-NNT[®] was also measured quantitatively through a psychological self-report tool included in the survey. NNT[®] will be considered effective if the majority of clients show progression up the emotional scale post-therapy, from less desired to more desired emotions.

If the majority of survey responses show a positive correlation, an upwards climb on the emotional scale, the therapy will be deemed successful. The effectiveness was also rated based on the opinions of the Emotional Health Practitioners (EHPs) that teach and provide the therapy for the organization. They were interviewed regarding their educational background and professional experience related to traditional therapy methods and then specifically NNT[®]. Their qualitative opinions, thoughts, and comparisons were added to the findings as a second perspective.

NNT[®] results were compared to literature findings presented for Cognitive Behavioural Therapy (CBT). This comparison highlighted the strengths and weaknesses of each model so that

community members can engage in the counselling that best suits them. CBT is the origin of numerous alternative therapy models, and it is therefore used widely and internationally (13). Talk therapy is a form of CBT where the client participates in face-to-face sessions with a psychotherapist/psychologist (13). The dialogue within these sessions aims to treat emotional disorders by improving negative patterns of interpretation and reaction (13). The treatment is founded on an interventional model with the goal of restructuring cognition so that client behaviour can improve (14). Over time, whether that be a span of months or years, CBT therapists have been noted to successfully alter their clients' dysfunctional thinking habits to lessen their symptoms and improve their well-being (15). Unlike NNT[®], this therapy method is primarily problem-based (13). Therefore, to construct positive changes, CBT focuses on the client's unique set of presenting problems (13). This starting point allows therapists to backtrack and determine the problems' root origin events so that they can understand why symptoms developed. This backtracking method is less prevalent with NNT[®] which focuses more on implementing new lifestyle changes in the present to optimise the future version of the client.

Similarly to NNT[®], collaboration is required for CBT talk sessions to function. The client must form a sense of solidarity with the therapist. This bond will allow the therapist to deeply understand why the client feels the way they do. Once a partnership is solidified, it will mirror how a scientist deciphers a scientific problem; it will be structured, detail-oriented, procedural, and analytical (13).

NNT[®] functions on a strong partnership between the client and counsellor as well. Although, the conditions of the partnership do differ. In CBT, the therapist understands and applies psychological science to treat a mental illness. They use forms and thought charts to progress the client through therapy and assess their symptoms to construct their clinical guidelines (CFHC EHP). The client participates in the dialogue and the formal assessments as they are instructed to whilst being blind to how they work (CFHC EHP). On the contrary, in NNT[®] the therapist teaches the client. NNT[®] is a psychoeducational-based model that teaches the client the underlying scientific principles through metaphors and interactive exercises (CFHC EHP). The exercises are practical and approachable to better engage and encourage the client. They are focused on creating new realistic diet, relaxation, fitness, etc., habits rather than strictly creating behavioural changes. Both models assist the client in acknowledging their thoughts,

feelings, and behaviours, although, NNT[®] expands this one step further by explaining to the client how their thoughts and feelings are formed (CFHC EHP).

If NNT[®] is perceived as effective from the client and practitioner's opinion, more individuals will be encouraged to use it as an alternative to traditional talk therapy. This is significant as it would give struggling individuals in both immediate and distant communities another valuable emotional health outlet to turn to. If NNT[®] is found to be effective, it would significantly assist individuals who found CBT to be ineffective for their personal needs. Despite its proven efficacy, CBT has accumulated negative reviews because of its rigidity and lack of interactiveness (16). Studies have noted that some CBT patients admit to feeling dissociated from the therapist due to the unwelcoming structure and lack of meta communication (16). With NNT[®]'s unique holistic approach, individuals with this common opinion could be provided an alternative outlet to improve their emotional health. If this alternative method can successfully improve the behaviour, mood, and lifestyle of its clients, the community would become more emotionally healthy overall as those with mental illnesses not engaging in traditional therapy could be treated with NNT[®]. With this, a portion of the community could talk to a traditional psychotherapist whereby they would focus on understanding their past trauma, and the remaining portion could try NNT[®] with a greater focus on making changes in the present to influence the future.

Background

Canadian Family Health Counselling is located in the East City of Peterborough, Ontario, and comprises many Emotional Health Practitioners (EHPs) (11). Each EHP has a unique background rooted in the helping profession. This includes Registered Psychotherapists, Masters in Social Work graduates, Registered Practical Nurses, Nurse Practitioners, and Health Sciences graduates. In addition to this prerequisite education, EHPs have completed a training and internship program offered at CFHC. With these qualifications and experience, EHPs tend to the community's psychological needs regarding mental illnesses such as Attention Deficit Hyperactivity Disorder (ADHD), anxiety, anger issues, depression, and grief/despair stemming from trauma (11). In addition, EHPs work with clients struggling with addiction, parenting, familial matters, as well as sexual and gender identity. They help individuals, families and/or couples whether they be part of the youth or adult community. While this organization works to

assist the local Peterborough community, it also expands to international clients with the intention of making a universal impact.

This organization was founded in 1997 by Kim Sargent, the clinical director (11). Kim Sargent has been a vital member in the emotional health care field for years. She completed her internship as a Human Services Counsellor at Sick Kids Hospital in Toronto where she was responsible for counselling patients facing issues with addiction and mental health (11). She then branched off and created a clinic at St. Joseph's Hospital in Peterborough in 1997 (11). From that point on, she along with her team have been working to implement the NNT[®] method into the field.

This team possesses the mandate of pushing the boundaries of the emotional health care field through an educational lens (11). According to CFHC, by educating the community and individuals in need of assistance, alternative methods to traditional CBT can be learned, practiced, and emotional health can be greatly improved (11). This organization focuses its attention on holistic treatment that differentiates itself from traditional talk therapy (11). They aim to treat mental illnesses with simple, practical, interactive, and easily understandable exercises that the clients can practice repeatedly. CFHC works to solidify learned results that can pass the test of time. This limits the need for clients to engage in both time-consuming and costly long-term therapy. This is where the idea of NNT[®] came to be.

NNT[®] is the blend between counselling techniques and new knowledge in neuroscience (11). The neural networks are the habits that are constructed in the brain (11). These habits relate to emotional health because each of them triggers a specific emotion (17). NNT[®] overwrites the negative habits that are ingrained in an individual's brain and stuck producing the same unwanted emotion repetitively. By learning and practising the core exercises and activities provided in Canadian Family Health Counselling's NNT[®] Practice Guide, individuals can remove their old neural networks and create new ones that are associated with appreciated positive emotions (11). Through repetition, the improved networks will become habitual, and the individual's disorder can be treated so that they can live an improved life. This therapy aims to provide sustainable results by replacing neural networks linked to negative memories with positive ones so that the individual can progress their life forward (11). This method contrasts traditional counselling as it does not prioritise analysing past trauma and dysfunctional thought (13). Once brief measures are taken to understand the client's particular emotional addictions,

NNT[®] moves forward and away from the client's past. This is done to prevent the client from repeatedly reliving the unwanted emotions linked to the past traumatic experience. NNT[®] counsellors prevent their clients from dwelling on uncomfortable memories, rather this negativity is replaced with comforting thought. This framework prevents the client from reinforcing unwanted neural networks and promotes the creation of new positive patterns of thought. Finally, NNT[®] possesses long-term sustainability with a short-term counselling timeframe of 4-6 months (CFHC EHPs). This could be an intriguing factor for many community members as traditional psychotherapy often ranges from 3-5 years to be considered effective (11).

NNT[®] gradually adds to and rewires the neural networks in a client's brain with core and supplemental exercises. These exercises are all provided and explained in the NNT[®] Practice Guide (11). Gaining a clear understanding of these exercises and their impact on the brain is vital. The guide's exercises exemplify ways that mentally ill people can alter elements of their lifestyles to improve their state of emotional health. The guide explains how the exercise steps are expected to physically alter the brains of those suffering with mental illness. Without understanding these NNT[®] exercises, it is impossible to compare and contrast its methodology to more popular therapy techniques and/or determine why it is or is not producing the hypothesised outcomes. This is why it is vital to review each core exercise specifically.

The first of nine core exercises, denoted as "Playdough Brain", explains the hardening process that the brain experiences as it ages (11). After approximately 30 years of age, the brain's capability to process new information lessens (18). It begins to shrivel up causing changes to the size, its vascular system, and its overall cognitive ability (19). These changes not only alter the brain's morphology, but they reduce the stream of neurotransmitters and hormones while simultaneously limiting memory (19). The habits that were repeated in the first 30 years of life will settle unless there is purposeful action to revert the process (11). The brain and its habits (neural networks) stiffen like playdough unless the individual actively practises to sustain and increase their cognition (11). To preserve the brain's cognitive abilities before it hardens, the individual must maintain or commence a healthy diet plan, regular exercise, active relaxation and reduce detrimental lifestyle choices such as excessive alcohol/drug intake and constant stress (19). If these healthy habits are practiced regularly, the parasympathetic nervous system can restore the brain daily (11). If not, the sympathetic nervous system will take over and cause a life of exhaustion, physical malaise, and reduced cognitive function (11). NNT[®] provides the clients

with practical exercises to oppose this hardening process and create new habits post 30 years of age. This exercise alters the brain's circuitry, heightens the connections between neurons, and activates the "rest or digest" mode (11). It encourages the client to analyse lifestyle habits that they admire. By doing so, they can create a continuum of activities they aspire to do on a daily basis whether that be going for a walk, maintaining an organised home office, or avoiding the bakery aisle at the grocery store (11). Eventually, they will integrate these desired activities into their own lives, adding new neural networks into their brain (11). This exercise is gradual so that it can be maintained. Immediate results are not ideal or encouraged as they are less sustainable in the long run (11).

The second exercise focuses on neuroplasticity, changing the brain's structure and neural connection pathways to reverse emotional overload (20). It uses a volcano as a symbol for the energy an individual has in terms of the emotions they are feeling (11). Sigmund Freud sparked the theme for this exercise when he compared the psychological mind to an iceberg (21). He explained that the visible tip of the iceberg represents the conscious mind whereas the submerged part of the iceberg represents the unconscious mind (21). Individuals repress certain emotions, memories, and thoughts to the unconscious mind so that they do not have to deal with them in the moment (21). Unfortunately, these repressed emotions do not dissipate, rather they start to build up (17). CBT discussion draws these repressed memories and emotions into the brain's conscious surface which can provide temporary relief for the client during the session (14). Although, when the client re-enters their comfort zone and daily routine again, the memories will fall right back into the subconscious, ready to be triggered again (14). When the client discusses their struggles with the therapist, the brain is understanding those past memories as reality at that moment (11). Therefore, rather than moving past the trauma, the brain is reliving it and reinforcing the network every session (11). By reinforcing the same networks, the same traumatic emotions are fired off for the individual which over time could detriment their health (22). NNT[®] explains these initial repressions as lava that fills up the bottom of an individual's mental volcano. As life progresses, more and more emotional discord piles up until the volcano is overloaded with lava (11). To compensate for a lack of space in the volcano, people create unwanted habits or develop psychological illnesses as coping mechanisms (11). These coping strategies can be in the form of addiction, anxiety, depression, or workaholism (17). Until these negative neural pathways are removed and replaced with positive ones, the individual will not

feel relief (11). This exercise forces the individual to consciously focus on the emotions that are repressed in their subconscious mind with their modern brain rather than their old brain (11). It makes the clients actively think about their memories and thoughts, write them down on a card, align them to an “Energy of Emotion”, and then keep the cards in close proximity (11).

Gradually, the individual will order these memories from past to present (11). This order will ease the brain and stop it from dwelling as the memory has been consciously processed (11). Whether that experience is linked to despair, shame, guilt, fear, anger, or frustration, it will be emptied out of the mental volcano and the individual can move on (11). While doing so, the individual will equally have to reflect on positive memories and experiences that provide their brains with a sense of appreciation. This will assist the individual in making more space in their volcano and boost them with greater amounts of energy throughout the process (11).

The third core exercise, “Rolodex”, helps people to understand how their emotions are stored within their brains (11). This exercise is founded on the Pareto Principle which is more commonly known as the 80/20 rule (23). This principle states that 80% of effects result from 20% of all contributors (23). In the emotional health care field this can be explained as 80% of one’s stored memories are composed from 20% of their experiences (24). If diving even deeper, this rule can be used to explain how stored emotions can be replayed during new experiences (11). People tend to store emotions from various past memories in their subconscious. Even though they are not at the front of their minds, if something occurs that triggers this memory, the associated emotion will rush through the individual (11). This rush of emotion does not solely represent the present experience, rather it represents all the built-up memories associated with this feeling (11). This is why the 80/20 rule is important to comprehend, as 80% of the emotion the individual feels stems from their past memories, while 20% of the emotion stems from the present occurrence (11). Until these stored memories are sorted and dealt with, the individual will be triggered repeatedly in their daily life even if the situation at hand may seem unimportant (11). This is because the brain cannot differentiate between what is reality and what is part of the imagination (11). In research conducted by the University of Colorado, it was found that imagining a threat is neurologically equivalent to experiencing the threat and the human emotion experienced by both is the same (25). NNT[®] takes advantage of this realisation by swapping the unwanted emotion once linked to a memory with a pleasant new emotion (11). This way, when an individual is faced with a trigger that reminds them of that memory, they will feel a sense of

appreciation rather than fear, despair, frustration etc. This exercise renews one's mental Rolodex of emotions with energies that are higher up on the scale (11). By doing so, new neural patterns are formed. Repeating this with several memories will rewire the once harmful circuitry into one that the individual feels at ease with (11).

The fourth core exercise focuses on the "Energy of Emotion" scale to improve emotional dexterity (11). Clients determine which emotion they are addicted to whether that be despair, shame, guilt, fear, anger, or frustration, and then with that knowledge they construct ways to move up the emotional scale (11). Rather than strictly disciplining the clients into new fixed behavioural tendencies like in CBT, they are encouraged to experiment with different ways of doing daily tasks (11). Once they find alternative tasks or thoughts that provide them with a sense of happiness, they will write them down and refer to them over and over. This will gradually strengthen a new neural network in replacement of an old, insufficient one (11). By focusing on new, positive ways to behave, the clients will gain perspective (11). When struggling with mental health issues, perspective drifts away and the illness blinds the brain (11). This self-reflection on what provides happiness versus what fuels the unwanted addiction is a necessity in developing cognitive perspective (26). The perspective means that new neural circuitry is initialised which allows for obsession over a specific negative emotion to fade, the state of disregard for everything and everyone will diminish, and balanced appreciation for care will be solidified (11).

The fifth exercise, "Crocodile", trains the client to use their prefrontal cortex in times of stress rather than reverting to their old brain, the amygdala (11). The exercise forces clients to take inventory of their symptoms when stress arises whether that be a heart racing, intense sweating, or shortness of breath (11). When these symptoms arise, the client must consciously determine if the situation is a matter of survival (11). If so, they can revert to their crocodile brain to enter their "fight or flight" mode (11). In most cases, survival is not the question, therefore the client can avoid their sympathetic nervous system and remain in their parasympathetic system (11). This allows their nervous system to calmly process the situation with their modern brain (11). The client is encouraged to review the situation verbally by saying something like, "I am not in danger, I can think intelligently about this situation rather than instinctually" (11). By doing so repeatedly when stress strikes, the crocodile brain will be trained to remain in the background so that the prefrontal cortex can take over (11). The repetition will

create new neural networks that will eventually become the first resort in times of stress (11). This will prevent the client from losing control and allow them to consciously move forward.

The sixth core exercise uses telephone poles to symbolise neurons. It explains that as new experiences take place, new neurons or telephone poles are inserted into the brain (11). As our brain develops further, these neurons become connected like the wires that connect the telephone poles (11). The neurons that are activated the most remain present as the individual ages, and those that are used less, eventually dissipate (11). The hypothalamus is responsible for sending signals to the body to release specific neurotransmitters when a specific neural pathway is signalled (27). When that thought or experience is replayed continuously, the neural network becomes memorized in the brain like a connect-the-dot pattern that is formed over and over (11). Once this connect-the-dot pattern is fired, the hypothalamus will autonomously tell the body to fire off the linked emotion (27). To reverse these negative thought patterns that are linked to unwanted emotions, the telephone poles and wires must be reconfigured into new patterns (11). To initiate the rewiring, this exercise requires the client to rearrange objects in their physical environment. By removing unnecessary furniture, opening the windows, turning off electronics, and organizing desk space for example, the client's signal receivers (dendrites) can properly process and accept new neural connections (11). If dendrites are overloaded with informational stress, their architecture will suffer in terms of reduced spine length and density, as well as limited branching (28). Dendrite overloading can occur from clutter, noise pollution, distractions, and harsh scents (11). If these stresses are taken out of the client's environment, their brain will be ready to grow and connect new neuron signals (11). Cold thermoregulation can also assist in repairing and strengthening the dendrites so that neurogenesis and neuroplasticity is optimised (29). This exercise encourages clients to take cold showers (11). By following these suggestions, clients will prepare their brains for new connect-the-dot patterns. Once these new patterns become habitual, the hypothalamus will focus its emotional signalling on them rather than the old, negative ones.

The seventh exercise compares the brain to an Etch a Sketch. It compares experiences to drawings on the Etch a Sketch; the first time someone experiences or draws something new, it requires the utmost focus, while the more they do it, the more it becomes automatic (11). Just as you shake the Etch a Sketch to start a new drawing, clients must shake their routines to make behavioural improvements in their lives (11). NNT[®] requires its clients to make small changes in

their daily routines (changing their regular breakfast, walking instead of driving, watching a new show at night etc.) so that the brain yearns for new neural habits (11). Creativity opposes the training of a neural network, rather it breaks down its normal operations (30). By undoing unwanted automatic neural circuits, room is made for new and improved ones that produce sustainable and improved behavioural changes (11). This contrasts CBT as rather than basing exercises on creativity, talk therapy is focused on repetition (11). CBT has been criticised by neuroscience experts as being ineffective because patients lack the willpower to sustain and follow up on the change/exercises the therapist suggests (31). This is likely because this change seems unattainable to the client as they are stuck in the comfort zone of repetition (11). Talk therapy requires the client to discuss their trauma repeatedly despite this repetition reinforcing the negative neural networks in the client's brain (11). New neural networks will not be formed and therefore the same trauma will be replayed over and over (11). When creativity is incorporated into therapy, the clients will be encouraged, and their results can be sustained (11).

The eighth core exercise, "Double Vision", deals with the fragmentation of clients' perspectives on what they should be versus what they are (11). If these two versions of the client's self are separated, they will suffer emotionally (11). This exercise explains that the clients should eventually believe that what they should be is who they are (11). Once they believe this, their double vision will blend into a congruent version of themselves. They will be able to fully appreciate this version rather than being disappointed with it (11). To complete this exercise the clients use a paper bag with qualities that describe what they are on the outside and then things they aspire to be on the inside (11). By gradually pulling one "should" out of the bag at a time, the client can make small positive changes to achieve their personal goals (11). These changes will become fixed as neural networks in their brain so that they are sustained over time.

The final core exercise deals with client assertiveness (11). It aims to build neural networks linked to assertive behaviour and remove those associated with passiveness and aggression (11). It is important to rewire passive networks in the brain as over time they start to emotionally drain the body (11). When constantly facing anxiety, the immune system is weakened which not only harms the person mentally but reduces their physical capability of fighting off disease and infection (32). Similarly, it has been discovered that people who are quick to anger and voice their opinions in an aggressive manner have a higher likelihood of developing heart issues such as coronary heart disease (33). This exercise works to convert the

passive and aggressive neural networks into assertive behaviour (11). By practising to prewrite thoughts, making appointments, keeping opinions clear and concise, asking questions to the other member of a conversation, and by reviewing how successful or unsuccessful conversations are, positive communication networks will be created (11). This will gradually provide the client with appreciation rather than shame.

The NNT[®] Practice Guide provides supplemental exercises in addition to the nine core exercises. One of the main supplemental exercises is named “The Balance” (11). The purpose of this exercise is to get clients to balance their energy equally between the fundamental aspects of a healthy life (11). This exercise requires the client to balance their life as they would with a bank book (11). “The Balance” separates life into nine boxes; nutrition, fitness, relaxation, family, relationships, friends, education, career, and contribution (11). Even though clients may be able to fill all these squares with activities and/or thoughts, for most individuals, one box grabs most of the brain’s attention (11). In many instances, if one of the nine boxes is causing stress or problems, that box is the sole mental focus (11). The brain wants to resolve that one issue and as a result the eight other boxes are neglected. In many types of therapy, that one box would be discussed and picked apart for multiple sessions (11). NNT[®] contrasts this view as it instructs the clients to consciously move their focus to all the boxes that are relaying success and happiness (11). Instead of dwelling and problem-finding in that one box, the client will add one activity that will consume most of their attention to each of the remaining eight boxes (11). The client will move box to box accomplishing these activities until they are left with the original troubled box (11). Because they rerouted their attention, the original issue will seem much smaller or completely irrelevant (11). If still present, the client will be instructed to make another round and accomplish activities in the eight other boxes (11). This will continue until the original problem is resolved. This trains the client to focus on positive aspects of their life that they can realistically complete without feeling overwhelmed (11). By improving each of the eight balance boxes, their behaviour and emotional well-being is improved. This prevents the client from dwelling on the negative issues that seem overbearing at the time (11). This process will become habitual as neural networks will form around it. This will boost the client’s morale with positive emotions when facing an issue rather than negative ones.

I used this balance sheet as one of the criteria for success or failure regarding the effectiveness of NNT[®]. This method of therapy focuses on the client's mental state pre-NNT[®]

and then post (11). Many therapists use modern software to track their client's progress frequently, some even after each session. The OQ[®] Analyst is an example of one of these programs (34). This program tracks the patient's obsessive thoughts, hallucinations, self-injuring, substance abuse, paranoia, delusion, suicidal thoughts, hypomania, fear levels, aggression levels, and eating habits after every session (34). This is intended to measure the client's progress or setbacks in a graphical format (34). Each category is ranked with a numerical score plotted vertically against the number of sessions received (34). This allows the therapist to determine whether their sessions are causing positive mental changes in the individual (34). Another similar software has been termed the Outcome Rating Scale (35). This software requires the therapist to enter information from each session for each client (35). The added information is compared to reference data from approximately 750 000 entries to determine a score for the session at hand (35). The client is rated based on their individual, interpersonal, social, and overall improvements regarding their specific mental illness (35). The ratings are plotted into a graph which shows the improvement or decline gradually from the start to the end of therapy (35). The Top Assessment is another modern tool used to complete frequent patient outcome referrals (36). The client must answer questions that provide the therapist with insight into their strengths, further requirements regarding treatment, and how they have improved over the course of treatment (36). Again, this assessment is visually converted into a graph with a bar representing each new outcome referral (36). These outcome bars are rated into severity levels to judge the client's progress (36). If the bars lower throughout treatment, the patient's symptoms are improving, whereas if they raise, the patient is suffering (36). Although these scales and graphical representations are useful in traditional talk therapy, they are not currently used in NNT[®]. Constant patient check-ins are avoided in NNT[®] as they are thought to detriment the client (11) According to Kim Sargent, regular check-in's discourage the client and in fact delay their overall progression. In NNT[®], mental blinders are put on the client to avoid inducing unwanted states (11). Progress is slow for many. NNT[®] does not strive to make overnight changes that revert as soon as client attention and effort fades. Rather, the gradual improvement enables highly effective and long-lasting results. For most clients, their development is a final realisation at the end of therapy (11). Because of this, outcome referrals put into a graphical chart for each session would only set the progress backwards and delay the therapy's impact (11). The

client would be putting all their attention on unrealistic immediate results rather than focusing on the overall growth from start to finish (11).

To ensure that clients remain encouraged with their therapy, improvement was rated post-therapy. Client progression from the start to the end of therapy was measured qualitatively in terms of lifestyle changes regarding nutrition, fitness, relaxation, family, relationships, friends, education, career, and contribution post-NNT[®].

Healthy nutrition is vital for improving a client's mental state (11). This therapy provides clients with a list of foods that assist with regulating the secretion of three key neurotransmitters: serotonin, dopamine, and norepinephrine (11). It is important that neurons are firing signals to secrete these neurotransmitters as they provide happiness, satisfaction, and stability for the brain (37).

Increasing fitness levels is also key when battling a mental illness (17). Exercising provides both soft and hard highs that give the brain a good feeling to crave (11). If these natural highs are craved, the clients are more easily able to move out of their negative comfort zones and desire emotional and behavioural improvement (11). These highs force open the receptor sites to neurotransmitters that equate to these appreciated emotions (17). The brain will learn to crave these emotions over time instead of falling backwards into pessimism (11). Hard highs such as dancing, boxing, hiking, boating, biking, and amusement park rides fulfil the brain's receptors with chemicals like endorphins, serotonin, dopamine, moderated adrenaline, and oxytocin (11). These are "feel-good" chemicals that will reduce client stress levels and promote happiness, strength, and social inclinations (29). The soft highs such as yoga, hot showers, and meditation for example, stimulate the secretion of endorphins, serotonin, dopamine, oxytocin, and prolactin which induces serenity (11).

Consistent relaxation promotes healing while treating a mental illness (38). NNT[®] requires clients to relax to transfer the body away from the sympathetic nervous system into the parasympathetic nervous system (11). If relaxation is practiced, the transfer will become habitual, and the nervous system will provide the client with relief rather than panic (11). The brain will crave the endorphins, GABA, DHEA, melatonin, oxytocin, serotonin, and prolactin secreted during relaxation because it will get the chance to rest, reduce the body's stress hormone levels, gain stability, and lower blood pressure (11).

NNT[®] also requires the clients to reflect on their family, relationships, and friends (11). Individuals are encouraged to analyse the good and bad qualities of loved ones and put into perspective which of these they possess as well (11). This ensures that the client appreciates the loved ones for their strengths and then learns to understand their weaknesses. In many cases the specific weaknesses are mirrored in the client (11). By working through relationship issues with compassion and appreciation, the client can tend to their own problems within the relationship rather than attempting to change the other person (11). This allows the client to grow personally and evolve into a better version of themselves for that person or the next relationship. This therapy also requires the client to develop trust in their friends (11). By creating an energy inventory of what boosts energy and what drains it, the client will learn to outsource with their friends (11). By asking friends to take over some of the energy draining activities, the client will have gained energy and appreciation in their life and for their friend (11).

NNT[®] also suggests that clients focus on developing their education whether that be through reading, schooling, or learning a new language etc. (11). By expanding out of a comfort zone and learning something new, the client's brain is forced to focus all its attention and pause its background distractions (11). This awareness causes new neurons and connections to develop. It is important that the subject matter of what the client is learning about is associated with a positive emotion (11). By focusing on a violent book, a disturbing news article, or an extremely frustrating language, the negative "Energies of Emotion" will be invoked by triggering unwanted neural pathways (11). These unwanted pathways will also be triggered if the various areas of a client's life overlap too closely. NNT[®] encourages clients to form separate bubbles around each aspect of their life and then separate these with space (11). NNT[®] pushes clients to digest their life's balance. It requires clients to reflect on whether or not they let aspects such as their career eclipse their alone time, their relationships, and their family. By reflecting upon this, clients can learn to focus their attention on one area at a time so that their lives become less overwhelming. (11). This space allows each area to breathe. In the case that one area suffers, the rest will continue to flourish.

The last criteria focuses on contribution. When suffering with a mental illness, in many instances the clients become completely consumed in their own thoughts (11). This therapy encourages clients to contribute to acquaintances, their families, their friends, or even strangers (11). Again, contribution breaks these individuals out of their comfort zones and initiates the

formation of new neurons. Contribution provides a sense of appreciation that can extensively reduce the unwanted symptoms (11). Clients rate their improvement or lack thereof in terms of these factors. If they have implemented these suggestions into their lives and are now living with improved behaviour and moods, it serves as evidence for the effectiveness of the therapy.

The effectiveness of NNT[®] was also rated quantitatively. To determine the emotional well-being of clients post-NNT[®], the Clinical Outcomes in Routine Evaluation-Outcome Measure (CORE-OM) scale was used (39). This psychological distress self-report measure includes 28 questions focused on client problems related to depression, anxiety, physical issues, and trauma, their day-to-day functioning related to close and social relationships, and their well-being in terms of self-feelings and optimism about the future. For each question, the client assigns a score from 0-4, where zero is indicative of negligible psychological distress and four is indicative of severe distress (40). This self-report scale allows the client to rate a specific series of questions from zero (not at all) to four (most or all the time) (40). This will allow the clients to appoint a numerical measurement to the questions regarding NNT[®] focus areas so that a clear and measurable indication of the therapy outcome is obtained. The question answers will be compiled to determine a final score that will indicate if the client is still suffering with their illness, or if their life has largely improved with the exercises. This measurement of effectiveness is vital as it differentiates NNT[®] from CBT methods. Scores from both models were compared to indicate which therapy method most effectively reduces its clients' distress. The method with the lowest average CORE-OM scores post-therapy indicated the greatest level of effectiveness. The scoring evaluations were used to address the argument posed by some CBT providers that there is negligible data to support the claim that talk therapy is effective (41).

If NNT[®] is perceived as effective, the emotional health care field will be greatly improved. The findings could act as further support to encourage more neuroscientists, counsellors, and psychotherapists to delve into this area of research. With a greater number of individuals conducting research in this area, the methodology could be better understood and potentially be shared with other communities to improve emotional health care as a whole. Additional research would strengthen the findings of this project by testing whether or not the trends are repeated in a different sample of individuals.

If deemed effective, its results could be outwardly applied to the field of forensic science. Forensic science is the application of the scientific method and scientific concepts to a legal

framework or problem. In many instances, criminals are subject to mental illnesses or emotional health issues that cause or encourage them to commit and recommit the crimes that they do (42). This is evident through prison surveys which have revealed that mental illness rates are higher among the incarcerated population compared to the non-incarcerated population (42). Many of these incarcerated individuals have been found to suffer from anxiety, depression, Antisocial Personality Disorder, and Bipolar Disorder (42). Because of these pre-existing illnesses, these individuals are more likely to become dependent on alcohol and drug-use as coping mechanisms (42). When these unhealthy habits turn into addictions, the mentally ill individual becomes more likely to engage in criminal and rash behaviour as their judgement is clouded (42). These habits build until it is extremely difficult to stray away from criminality. NNT[®] could be a beneficial treatment for individuals with a criminal past, unlawful habits or negative emotions leading them to potential crime by rearranging the negative neural networks in their brains. If NNT[®] could inhibit the patterns of thought linked to these bad habits and as a consequence treat the underlying mental illness, the unhealthy addictions could be stopped, and the unlawful behaviour could be prevented (42). NNT[®] could construct new, desired emotions and thought patterns that would solidify a better sense of well-being for the offender. The enhanced mental clarity and appreciation would encourage them to act lawfully. If practiced enough, this could potentially lessen the risk of recidivism. This therapy could successfully reverse the offender's unhealthy addictions and behaviours as a side-effect of treating their principal mental disorder (42). If the offender's lifestyle changed for the better, their past habits would be broken, and they would no longer feel the need to engage in unlawful behaviour (42). Their new and improved lifestyle would be positive, healthy, and lawful which would result in their likelihood of recommitting a crime to lower. If this method worked effectively for multiple offenders, recidivism rates of the community as a whole could lower.

Finally, this project provides practical experience of the research skills that have been taught and developed throughout the undergraduate degree. It intertwines using the scientific method, statistical skills for data analysis, creating surveys and datasets, and determining a hypothesis and following up with the results in a formal lab report. This project transfers skills practiced in undergraduate courses to a realistic perspective.

Methodology

Ethical Considerations

Because the student researcher of this project surveyed clients about their personal therapy experiences as well as their past and current states of emotional health, it was necessary to complete an ethics application. The research methodology was approved by the Trent University Research Ethics Board and the Forensic Undergraduate Research Ethics Committee on January 13th, 2022. This ensured that the stakeholders involved were respected.

The student researcher prevented the exploitation of CFHC clients by securing the complete and filtered patient lists within the secured JaneApp portal and Microsoft Excel on the researcher's computer (43). The researcher ensured that every spreadsheet containing client names was permanently deleted once the survey was distributed. This ensured that all identifying information was confined within the organization's JaneApp portal. Additionally, the survey responses were all anonymized and given a randomly generated response ID within Qualtrics. These measures ensured confidentiality so that the identities of the clients remained private. Anonymity also ensured that controversy was prevented as, even if a client explained that they disliked the therapy, their opinion could not have been traced to their identity. Moreover, the survey system, Qualtrics, was password protected within the student researcher's computer. No other individuals had access to the Qualtrics account, results, and distribution. The JaneApp data was also password protected within the host organization to ensure that all client information was secured. Furthermore, the drafts and final versions of all reports, analyses, observations, and presentations were password protected on the student researcher's computer.

In addition, the experience and personal emotional states of the clients were respected. The host excluded a particular client who had used NNT[®] to treat trauma related to an extremely devastating event. The survey and project subject matter was deemed too triggering for this client which is why they were removed from the client email list. This approach ensured that group vulnerability was monitored throughout the process (43). Group vulnerability was also kept in check by limiting the age group to 16 years and older (43). This filter prevented youth who lacked the ability to consent from participating.

An email was sent to the filtered client list that contained an explanation of the project, the Informed Consent Waiver, and the survey link. This email clearly indicated that participation was voluntary, and solely those who felt comfortable sharing their responses should consent to

participating. This gave the clients notice as well as the opportunity to ignore or decline participating. Even after clients consented to participate, it was made clear that they possessed the ability to withdraw at any time. They were able to decline sending the survey back, or if already sent, their survey results could be excluded from the data. This ensured that research risk was minimised (43). The project respected the rights of each client and prevented them from gaining stress or frustration with the survey process. Each client was also provided with a maximum of four weeks to fill out and send the survey back. This allowed the clients to continue with their daily routines and complete the questions when they had free time. This prevented the clients from becoming overwhelmed.

In terms of researcher risk, the student was not exposed to any harmful chemicals, substances, or present in any harmful places. This research project was conducted virtually. The student researcher did not visit the host organization or any of the clients. They solely conducted surveys where the clients were anonymous and interviews where the practitioners shared virtual communication.

Finally, the researcher considered the consequences/impact of their research. This was an important initiative for the host organization. It was ensured that the survey prompt, report, and presentation explained that these results greatly impacted the Peterborough community as well as other communities. This provided the clients with a clear purpose to the survey so that they were not deceived in any way. This project was designed to encompass low risk and high benefit. Educating people of this widely unknown therapy method could vastly change the lives of residents in many communities by giving them an alternative therapy method, or by indicating to them that they should remain with their current therapy method.

The sole direct cost of this research was \$25.00 for the Trent Community Research Centre to print the final research poster. There were no incentives being put forward to intrigue the clients to participate. This removed the risk of coercion to participate (43).

Literature Review

A literature review was performed as the initial research step. This was completed to obtain an understanding of background information relevant to NNT[®]. This included reading the NNT[®] Practice Guide created by the host organization. The core exercises provided in the NNT[®] Practice Guide were analysed to obtain an understanding of the exact activities that the clients had completed. These core exercises include “Playdough Brain”, “Volcano”, “Rolodex”, “Energy

of Emotion”, “Crocodile”, “Telephone Poles”, “Etch a Sketch”, “Double Vision”, and “Assertiveness Training” (11). By reading through each of these exercises, a first-hand perspective of the process the Emotional Health Practitioners teach the clients was obtained. The supplemental exercises in the practice guide were also reviewed.

The literature review was expanded upon by reading relevant peer-reviewed research articles pertaining to modern neuroscience and neural network formation. These were sourced from online resources such as Omni, PubMed, and Google Scholar. This solidified an understanding as to why this therapy was created and how it supposedly physically altered the patients’ brains.

Lastly, the information provided in the NNT[®] Practice Guide was compared and contrasted with online literature focused on the background, methodology and outcomes of CBT, traditional talk therapy. By comparing these two different therapy methods, the positives and negatives related to each became apparent. This helped to indicate whether the host organization’s method was worth using over traditional methods. The literature review also introduced multiple self-report psychological distress scales that are used by counsellors to measure the progress of their clients. This aided the researcher in selecting the scale that was used in this project.

Survey

The second methodological step involved creating a survey on Qualtrics. The survey was manually created by the student researcher. It was divided into two sections. The first section, the quantitative section, contained the CORE-OM psychological distress self-report tool (44). This section contained 28 questions pertaining to three topic areas: well-being, problems, and functioning (44). In the original CORE-OM survey, a fourth risk topic area is included (44). The six questions in the risk topic area were omitted for this survey as they were deemed inappropriate, insensitive, and potentially triggering in nature. Once these 28 questions provided from the CORE-OM tool were incorporated into the survey, the second section was added. This section was qualitative and included 14 questions. These questions were open-ended and related to client lifestyle changes post-NNT[®]. With both sections included, the survey contained 42 questions (as shown in A-1).

To gather data, the survey was distributed to a client list. Below are the conditions that were used to compile the client list from CFHC. These steps were approved by Trent University's Research Ethics Board as well as the host organization.

- The student researcher was granted temporary 24-hour access to the CFHC administrative portal in the JaneApp.
- The student researcher logged into the JaneApp portal and entered the REPORTS section
- Within the REPORTS section, the student researcher opened the PATIENT LIST
- Within the PATIENT LIST section, the student researcher selected the EXPORT tab at which point the complete patient list was exported into Microsoft Excel.
- Within Microsoft Excel, the patient list was filtered. This included removing any staff members, any clients that had received fewer than five NNT[®] sessions, and the duplicate entries of any client names. One particular client was also removed from the list. The host organization determined that it was inappropriate for this client to participate in the survey due to the nature of their past trauma.
- This resulted in a list containing 857 clients.

Once the client list was compiled, the student researcher distributed the Qualtrics survey. To do so, they entered the distribute section in Qualtrics at which point the email option was chosen. The email addresses of the 857 selected clients were then copied from Microsoft Excel and pasted into the contact list entry box within the Qualtrics distribution email. Once the contact list was compiled, the student researcher entered the subject line and the email body. The email body included an introduction to the research project, the Informed Consent Waiver to follow ethics guidelines, and the Qualtrics link to the survey (as shown in A-2). Once these steps were complete, the email was sent to distribute the survey. Two reminder emails were also distributed through Qualtrics to increase client responses. The first reminder was sent to the client list after the survey had been open for a week and the second was sent out two weeks after that. In total, the survey was open to clients for one month.

Once the survey client list and survey distribution email were finalised, the student researcher permanently deleted the excel spreadsheet from their computer and the temporary JaneApp access was terminated. This ensured that client identities remained protected within CFHC's JaneApp portal. Additionally, the survey responses were anonymized through Qualtrics

so that data was not tied to client identities. Qualtrics created a randomised client ID for each survey response to ensure anonymity.

Interview

The third methodological step involved creating a semi-structured interview for the Emotional Health Practitioners at CFHC. This interview was structured to determine their educational background, their professional experience in terms of both NNT[®] and CBT, and their comparative opinions regarding both methods. The EHPs were asked 12 open-ended questions in a Microsoft Word document. The document was distributed by email to five EHPs; three being senior EHPs and two being standard EHPs. Four EHPs responded to these questions by typing their answers in the document and one EHP responded to the questions verbally over Zoom. The identities of the EHPs were kept confidential to the student researcher.

Biases

While conducting a research project, one important objective is to mitigate any biases present as much as possible. As NNT[®] was created and is proprietary to CFHC, it is vital that while surveying the clients, their true opinions are heard. This is why the survey group encompassed the entire client list. The clients were not handpicked by the host because that could have been biased. The host is aware of which clients provide positive feedback often, and which do not. The host is also aware of the clients who are currently in the midst of purchasing sessions, who have completed therapy, and who quit therapy prematurely. That is why it is important that the host had no role in choosing who responded to the survey and who did not. This strategy mitigated sampling bias by incorporating a diverse study population rather than solely including clients who are known to support the effectiveness of the therapy. This dually mitigated the potential pecuniary bias as the sample population was not solely composed of customers who are currently purchasing NNT[®] sessions. The sole role that the host had in regard to the target group was to remove the client who was unable to participate due to their past trauma being too extreme and volatile.

The NNT[®] Practice Guide was a main source of information used in the literature review (11). This book was written by the host which could introduce a level of bias. Although this is possible, it was impossible to exclude this piece of work as it is what the clients used during their therapy. It was therefore vital towards understanding the therapy process and core exercises. The

bias was mitigated by equally examining alternative methods such as traditional talk therapy. By learning about both suites of therapy, one model was not favoured over the other.

Finally, as NNT[®] has been used for years by this organization, the clear hypothesis is that it is effective. If it was not, the organization would have turned to an alternative. Although this is evident and the host hoped that the clients would have the same opinion, the research was not designed to prove this. The survey and interview questions were not chosen to solely focus on the benefits of the therapy, rather the questions were neutral. They ensured that the responses included room for both advantages and disadvantages of both therapy models.

Analysis

The quantitative analysis began once the CORE-OM survey questions were completed by the clients. The student researcher went through each client's survey individually and calculated the CORE-OM score as per the manual (44). For each question, the client selected one of five possible answers. These answers were; not at all, only occasionally, sometimes, often, and most or all of the time. Each of these answers had a respective numerical score from 0-4 respectively, where zero indicated negligible psychological distress and four indicated severe distress. Therefore, if a client selected "not at all", they would receive a score of zero for that question. If they chose "sometimes", the associated score would be two. The score for each question listed in Qualtrics was tallied using Google Sheets (as shown in A-3). Once this was completed for each of the 28 total questions, the total score for the client was calculated. If the client's score for all 28 individual questions was zero, their total score would have been zero. Alternatively, if the client's score for all 28 individual questions was four, their total score would have summed to 112. Once the total score was summed, the client's mean CORE-OM score was calculated. This was computed by dividing the client's total score by the number of questions answered (28 questions). This enabled a mean score from 0-4 to be calculated for each survey respondent. These scores were imputed into the Google spreadsheet as well. Once the mean score for each client was obtained, the overall mean CORE-OM score for CFHC was computed with the Google Sheets "Average" command. As each client's mean CORE-OM score and CFHC's mean organizational score were calculated, Figure 1 was able to be created using Python. This enabled CFHC's mean CORE-OM score to be compared visually with CORE-OM's clinical cut-off.

To calculate the three subscale scores for each client, the same process was used. The CORE-OM tool indicates whether each question is related to well-being, problems, or

functioning. Therefore, by summing all the individual question scores for each subscale, a total subscale score for each client can be calculated (as shown in A-3). The total subscale score for each client could then be divided by the number of survey questions pertaining to that subscale. This value provided the mean CORE-OM subscale score for each client. To obtain the average CORE-OM score for CFHC in each subscale, the Google Sheets “Average” tool was used. With these values calculated, the student research was able to create Figure 2 in Python. Seven peer-review articles were analysed to obtain the CBT mean CORE-OM scores shown in this figure.

To obtain the data for Figures 3-7, the student researcher examined the Qualtrics survey responses individually. When a question’s response distribution showed a large level of agreement among clients, the question was noted and flagged in Qualtrics. On the contrary, if a question’s response distribution showed minimal to no consensus among clients, the question was overlooked. This resulted in five questions being flagged and added to this target group. The charts in these figures were created with Qualtrics by adding visualisation to the data. These charts are important as they highlight specific focus issues that NNT[®] successfully treated in the sample population. For each of these five questions, a large proportion of CFHC clients agreed by selecting “not at all” as their response. The “not at all” selection is scored with a zero, indicating a negligible-healthy amount of psychological distress. Multiple clients indicated that they experience minimal mental distress post-NNT[®], specifically for the issues targeted in these five questions. Because of the insight provided with this question filtering, the effectiveness of NNT[®] can be analysed more specifically to certain symptoms and mental illnesses.

The scores shown in Table 1 were computed by taking the mean client CORE-OM score for each of the five target questions. Qualtrics displayed the proportion of clients that selected each answer, as well as the total number of respondents, which enabled the mean to be calculated. To obtain the mean CBT CORE-OM scores for these five questions, two peer-reviewed articles were analysed. The scores provided in the literature for these questions were compared to the scores calculated for CFHC which enabled the comparison to be made.

To analyse the qualitative data regarding lifestyle changes, a table in Google Docs was created. This table included each of the nine focus factors as well as how many clients indicated improvement and how many did not for each factor. This enabled the percentages in Table 2 to be calculated. The student researcher also added relevant client quotes to this table. The same

method was used to calculate the percentage of clients who deemed NNT[®] results to be sustainable and the percentage of clients that recommended the therapy to others.

In Qualtrics, all client responses for each survey question can be compiled together. This ability was used to determine the major reasons as to why clients sought therapy as well as the client emotions pre- and post-NNT[®]. The student researcher compiled a list of reasons that clients listed and then tallied how many responses each reason obtained. This enabled the student researcher to rank which reasons were most supported, and then which ones were the least. This tallying process was used for the emotions pre- and post-therapy as well. Once the tallies for each emotion were listed pre- and post-therapy, the percentages were calculated. The percentages were visually implemented into Figure 8 by using Google Sheets.

To analyse the Emotional Health Practitioners' (EHPs') written and oral testimonies, the data was compiled into a table in Google Docs. By doing so, the opinions of each EHP was compared against the others. This enabled major themes to be extracted, quotes to be obtained, and common differentiations between NNT[®] and CBT to become apparent. This information was summarised and assembled into Figure 9 by using Google Slides.

Results

Quantitative

In total, the survey obtained 42 complete responses from CFHC clients. After calculating the mean CORE-OM scores for all client responses, the overall mean CORE-OM score for CFHC was determined to be 1.39. The CORE-OM tool provides a clinical cut-off value so that researchers can compare their results to a reference value. The clinical cut-off value is 1.43. This value differentiates individuals experiencing a healthy-mild level of psychological distress from those experiencing moderate to severe levels of psychological distress. Therefore, a value below the clinical cut-off is desired as a therapeutic outcome for counselling services. The mean CORE-OM score for CFHC is below this cut-off indicating that the majority of CFHC clients experience a healthy-mild level of psychological distress post-NNT[®] (as shown in Figure 1).

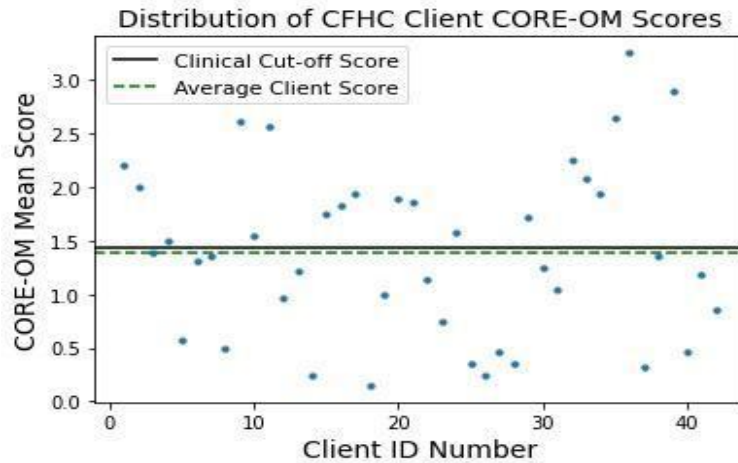


Figure 1: The CFHC client CORE-OM mean scores compared to the clinical cut-off value provided by the tool. CFHC scores were on average less than the clinical cut-off, indicating that post-NNT[®], most clients had healthy to mild mental distress.

The highest CORE-OM mean score (the client with the greatest psychological distress) was 3.25, while the lowest score was 0.15. In total, there were 14 clients with a score in the range of 0-1 (healthy-low distress), 20 in the range of 1.1-2 (low-mild distress), 7 clients in the range of 2.1-3 (mild-moderate distress), and 1 client in the range of 3.1-4 (moderate-severe distress). Again, this displays that the majority of CFHC clients result with low levels of psychological distress post-NNT[®].

The survey was further broken down into three subscales. The first subscale, subjective well-being, resulted with a client mean CORE-OM score of 1.64. The second subscale, problems, resulted with a client mean CORE-OM score of 1.48. Finally, the third subscale, functioning, resulted in a client mean CORE-OM score of 1.23. Therefore, post-NNT[®], CFHC clients experienced the least distress in terms of their overall functioning and the most distress in terms of their well-being. Despite the score being the highest in the well-being subscale, the score was still below the value of 2, indicating that the distress experienced was mild and only slightly over the clinical cut-off. The score for functioning was below the cut-off and in the low-mild range whereas the score for the problems subscale was above the cut-off and in the low-mild distress range. In terms of understanding the distress levels of CFHC clients post-NNT[®], it is important that a comparison to client scores post-CBT be made. With this comparison, it is evident whether NNT[®] clients or CBT clients experience greater levels of

psychological distress post therapy. Figure 2 identifies that for each subscale, well-being, problems, and functioning, clients post-NNT[®] experienced less psychological distress compared to clients post-CBT. This is also evident as the post-NNT[®] scores are closer to the non-clinical population scores compared to the post-CBT group.

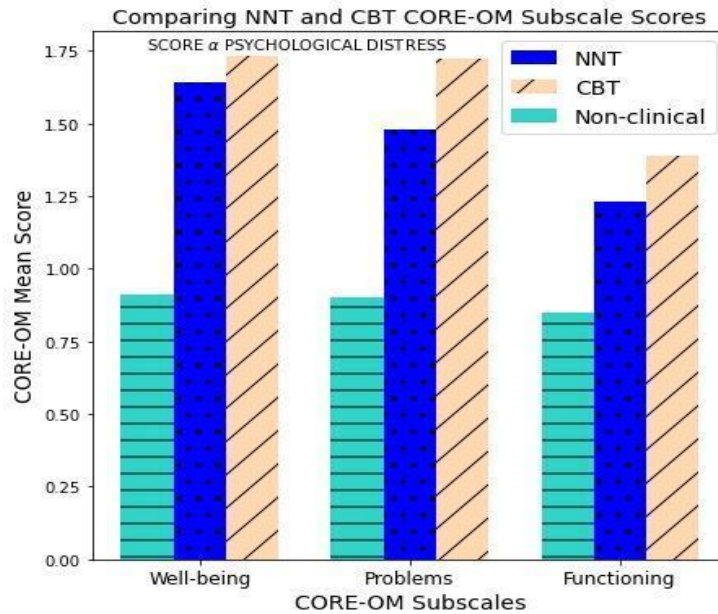


Figure 2: The CORE-OM mean subscale scores for clients post-NNT[®] and post-CBT in comparison to the non-clinical population. CBT and non-clinical scores obtained and averaged from 7 scholarly articles. CFHC clients who completed NNT[®] reported less challenges, a sustained sense of well-being, and higher functioning compared to clients post-CBT.

The survey results indicated certain CORE-OM questions with a great consensus among the CFHC clients. Whilst 23 of the 28 questions demonstrated evenly spread response distributions among the rating scale of 0-4, five of the questions displayed that many of clients shared the same response, “not at all”. As this response is scored as zero and indicative of minimal psychological distress, these five questions help to target the analysis. They indicate the specific symptoms/issues that NNT[®] is effectively able to treat, thereby lowering the related distress. These questions are shown in Figures 3-7.

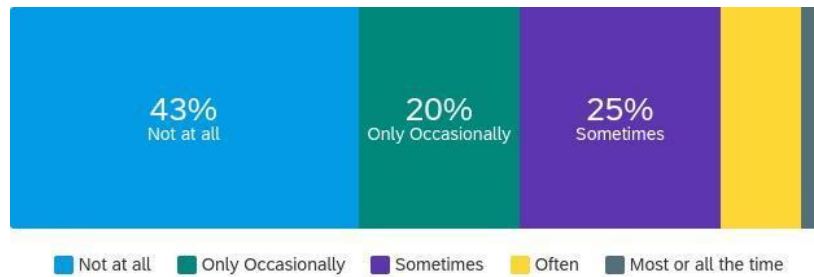


Figure 3: Displaying the distribution of CFHC clients that selected “not at all” regarding Question 9 of the survey; in the last week... tension and anxiety have prevented me doing important things.

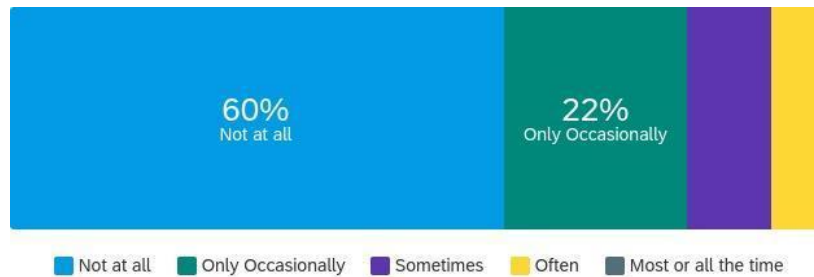


Figure 4: Displaying the distribution of CFHC clients that selected “not at all” regarding Question 13 of the survey; in the last week... I have felt panic or terror.

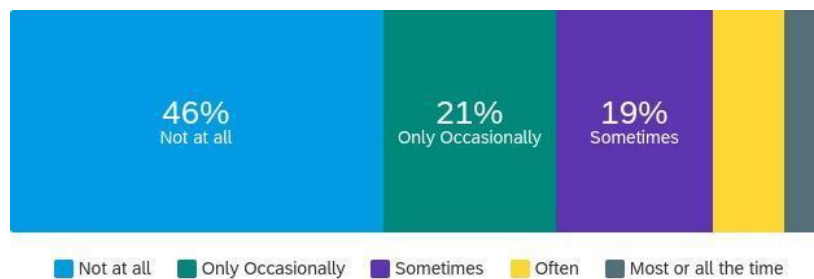


Figure 5: Displaying the distribution of CFHC clients that selected “not at all” regarding Question 19 of the survey; in the last week...I have felt despairing or hopeless.



Figure 6: Displaying the distribution of CFHC clients that selected “not at all” regarding Question 21 of the survey; in the last week...I have thought I have no friends.

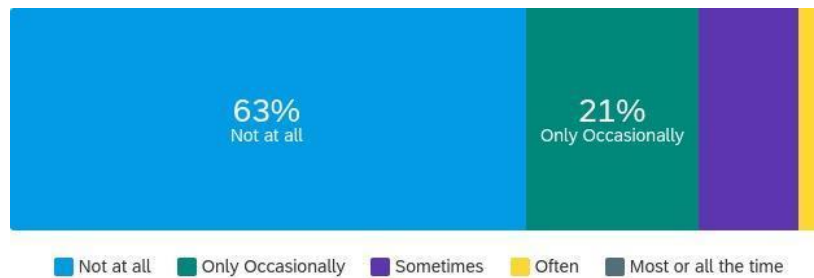


Figure 7: Displaying the distribution of CFHC clients that selected “not at all” regarding Question 28 of the survey; in the last week...I have felt humiliated or shamed by other people.

Two peer-reviewed articles (sample sizes of 118 and 1106 individuals respectively) provided the CORE-OM mean scores regarding these five isolated questions for clients post-CBT. These published scores were compared to the scores of CFHC clients to identify which therapy model resulted in the least distress in these target areas. Table 1 identifies the variation in scoring for these five questions. CFHC clients possessed lower scores and indicated less distress than CBT clients regarding these target areas.

Table 1: Comparing the mean CORE-OM scores of five questions. These questions were chosen specifically from the 28 total CORE-OM questions as client responses showed the greatest consensus. Scoring is rated from 0-4, where zero indicates negligible psychological distress and four indicates severe distress. Therefore, low scores are desired as an outcome of therapy. Post-CBT mean scores displaying the average score provided from two scholarly articles.

CORE-OM Question	Post-NNT [®] mean score	Post-CBT mean score
In the last week... tension and anxiety have prevented me doing important things	1.11	1.41
In the last week... I have felt panic or terror	0.63	0.96
In the last week... I have felt despairing or hopeless	1.07	1.27
In the last week... I have thought I have no friends	0.80	0.87
In the last week... I have felt humiliated or shamed by other people	0.56	0.68

Qualitative

The qualitative results focused on understanding the lifestyle changes that CFHC clients implemented post-NNT[®]. These lifestyle alterations are in regard to nine focus areas; nutrition, fitness, relaxation, relationships, family, friends, education, career, and contribution, as shown in Table 2. In the open-ended response section of the survey, CFHC clients indicated that the least improvement was in terms of fitness. The majority of clients (58%) did not improve their fitness regime. For the 42% of clients who did improve their fitness post-NNT[®], the greatest changes involved increasing the frequency walking outdoors. 64% of the clients who improved their fitness, also increased their walking. In this subgroup, the second largest change involved increasing the frequency of cycling (27% of clients). 18% of clients in this subgroup implemented yoga into their daily routine. One client stated that they were “adding more weekly exercise while using NNT[®] by jogging and walking a few times a week. This helped [their] mindset tremendously”. On the contrary, most clients did not improve their fitness mainly due to

a lack of motivation. One client expressed that they “wanted to exercise more often, but [they] did not have enough motivation to do so”.

Clients indicated that the greatest improvement post-NNT[®] occurred in the contribution focus area. CFHC explains contribution as when a client puts forward their personal energy, effort, and time to assist and care for their family, friends, and community. This could include babysitting for a family member, tutoring a friend, donating to a charity, and/or organizing a community social event. The vast majority (88%) of clients contributed more to their family, friends, and community post-NNT[®]. Many clients expressed that their progression through the NNT[®] program enabled them to feel emotionally available and energetic which encouraged them to contribute to others. They explained that their contributions “feel very rewarding, warming, happy, and impactful”. One client stated that they now volunteer with a wellness community group, and this makes them “feel good knowing [that they] can help someone get out of the dark place [they were] once in”.

In terms of nutrition, the majority of clients implemented healthier eating habits into their lifestyles post-NNT[®]. One client stated that their “nutrition has improved significantly. [They] eat more regularly and include more fruits, vegetables, and seafood”. Clients showed a high level of agreeance in terms of implementing more nuts, fruit, vegetables, seafood, and water into their diet whilst limiting their intake of sugar and fried foods post-NNT[®].

82% of clients implemented habits to increase their relaxation post-NNT[®]. In this subgroup of the total sample, 48% of clients implemented mindful meditation into their daily routines and 17% added self-care practices. Multiple clients indicated that NNT[®] introduced them to the benefit of listening to podcasts. Clients stated that this allowed their minds to settle, their background distractions to fade away, and their focus to sharpen amidst the duration of the podcast. When used as a daily practice, this implementation decreased clients’ stress levels.

The majority of CFHC clients improved the state of their romantic relationships post-NNT[®] (Table 2). Clients stated that NNT[®] encouraged them to become attracted to empathetic, emotionally safe, and supportive people. One client explained that post-NNT[®], they “feel like a partner rather than a victim. That [they] are very content now”. Another client explained that post-NNT[®], they “love their partner more because [they] love themselves more”. For some clients, NNT[®] did not improve their relationship. Rather, it pushed some clients into terminating their relationship to move onward. One client stated that they “noticed [they] are less

patient with those that do not sync with [them]. [Their] relationship is more strained as [they] feel [they] may be disassociating with [their] partner as they are not putting forth the same efforts”. The clients who experienced this relationship strain post-NNT[®] expressed that they learned how to set appropriate boundaries through the therapeutic process.

In terms of family and friends, 64% of clients stated that their relationships improved post-NNT[®]. One client explained that NNT[®] provided them with “the support they needed to reinforce a healthy relationship dynamic”. A major theme in this focus area was that NNT[®] gave rise to a stronger sense of communication. Whether that involved communication with friends, colleagues, or family members, NNT[®] instilled assertiveness which allowed the clients to be better understood and respected in their relationships.

The majority of clients implemented new educational outlets into their lifestyles post-NNT[®], as shown in Table 2. Clients expressed that the therapy encouraged them to learn about mental health rather than just fix it. This resulted in clients increasing their frequency of reading self-help novels, listening to educational podcasts, and watching tv shows that invoked thought and discussion. Many clients limited their viewing of fictional, violent, and dramatic tv shows and movies, and increased their viewing of non-fictional subject matter. 36% of clients did not implement new educational habits post-NNT[®]. Multiple clients in this subgroup stated that they attempted to read novels although they were too drained by the end of the day that they lacked the mental energy to do so. As a result, they gave up and watched their usual tv shows instead.

NNT[®] taught 56% of clients how to separate their professional life from their personal life. 20% of clients stated that they had already isolated their work from their home pre-NNT[®], and 24% of clients stated that post-NNT[®], they still blended their career with their personal affairs. Evidently, NNT[®] assisted clients with creating healthy boundaries between their job and their family life. One client stated that they now “treat their job like a job and only invest [themselves] in it when [they] are on the clock. [They] did not do this before NNT[®]”.

Table 2: Comparing the lifestyle improvements or lack thereof for CFHC clients post-NNT[®] in terms of nine focus areas.

	Nutrition	Fitness	Relaxation	Relationships	Family/ Friends	Education	Career	Contribution
YES Improvement post-NNT	52%	42%	82%	57%	67%	64%	56%	88%
NO Improvement post-NNT	48%	58%	18%	43%	33%	36%	44%	12%

The EHPs were also asked to rate the focus areas in order from greatest client improvement to least client improvement post-NNT[®]. The majority of EHPs believed that CFHC clients improved the most in terms of relationships. All the EHPs believed that CFHC clients improved the least in terms of contribution. Interestingly, this opinion was opposite to the client survey result.

The qualitative portion of the survey additionally sought to understand why clients joined counselling services. The surveys displayed that clients largely sought counselling to improve relationship issues (26% of clients). The second most prevalent reason that clients joined NNT[®] was to treat anxiety (19% of clients). Depression was the third major contributor, representing 17% of clients. The proportion of clients who joined counselling to overcome past trauma as well as to speak to an unbiased and supportive individual was equal at 12%. Finally, 10% of clients sought counselling to assist with their children-related problems. EHPs were also asked to indicate what the most common issues presented by new clients are. Client opinions mirrored the EHP opinions as they too expressed that relationship issues, anxiety, and depression were the most common causes.

Moreover, the survey asked the clients to express what their most prevalent emotion was pre-NNT[®]. To gauge the perceived effectiveness of NNT[®], the clients were also asked to provide their most prevalent emotion post-NNT[®]. The results of these questions are demonstrated visually in Figure 8.

Displaying the “Energy of Emotion” Distributions of CFHC Clients Pre- and Post-NNT®.

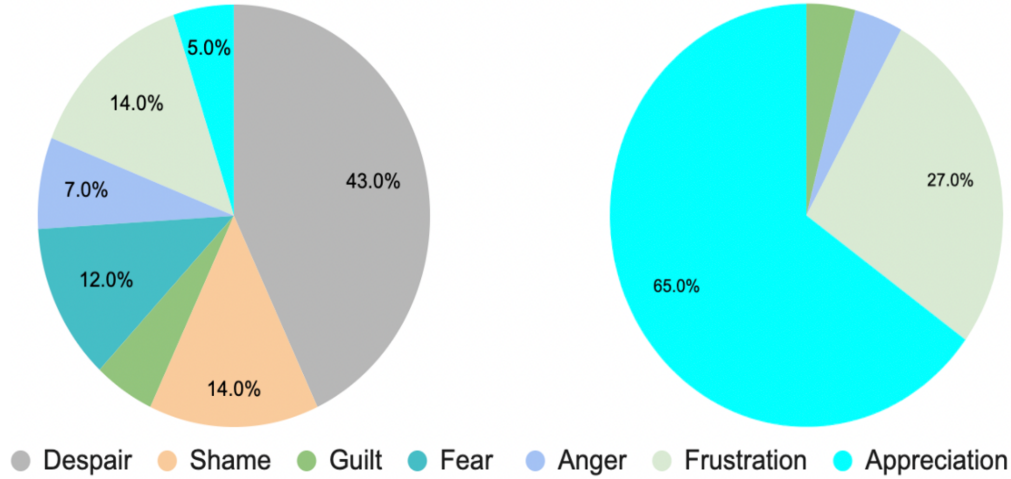


Figure 8: Comparing the client emotion distribution pre-NNT®(L) versus post-NNT®(R). The majority of clients were in a state of despair pre-NNT® whereas the majority of clients resulted in a state of appreciation post-NNT®.

This result supports the perceived effectiveness of NNT®. To determine if client improvement was short-term or long-term, clients were asked whether they sustained the new lifestyle, mood, and behaviour improvements. 76% of clients stated that their positive results from NNT® were realistic and sustained long-term. One client emphasized this finding by stating that their “new lifestyle is [them], the change is realistic and sustainable, although it involves diligence”. A small proportion, 24%, of clients regressed into their old negative habits post-NNT®. One client explained that this happened because the new lifestyle implementations become too overwhelming to maintain. They expressed that during the NNT® sessions, the new changes are clear and seem realistic, although honouring these implementations daily becomes difficult. Despite the rigour that accompanies maintaining a healthy mindset and lifestyle, 86% of clients recommended that other community members engage in NNT®. One client commented that they would surely recommend NNT® as “it changed [their] life”. Another client revealed that they “have so much deep appreciation for the therapy and will certainly advocate for it and its many benefits”. 14% of clients did not recommend this therapy. The major reason that clients did not recommend NNT® was due to the cost. Some clients explained that although they enjoyed the sessions, they could not continue their therapy to the full extent as it was too costly.

The final portion of the qualitative analysis involved a comparison of NNT[®] and CBT from the EHP perspective. As each EHP had experience researching, studying, receiving, or providing both NNT[®] and CBT, their opinions assisted in differentiating the two models. These findings are represented in Figure 9. In the EHP opinion, NNT[®] differs from CBT as it does not principally focus on past trauma that has caused dysfunctional thought. Rather, NNT[®] focuses on making changes to the client's present lifestyle by altering their habits related to nutrition, fitness, relaxation, relationships, and career. NNT[®] considers all aspects of the client's life to empower new thought patterning, while CBT focuses on the mind and relaxation specifically. While both methods use metaphor exercises to help the clients understand and change their negative habits, NNT[®] does so with playful interactive exercises. On the contrary, CBT uses a more structured professional approach by incorporating thought charts and forms into the sessions. To obtain positive results, NNT[®] sessions usually take place for 4-6 months, whereas CBT sessions usually span over 3-5 years. Finally, no matter which therapy method is used, it is vital that there is a strong bond between the client and the counsellor.

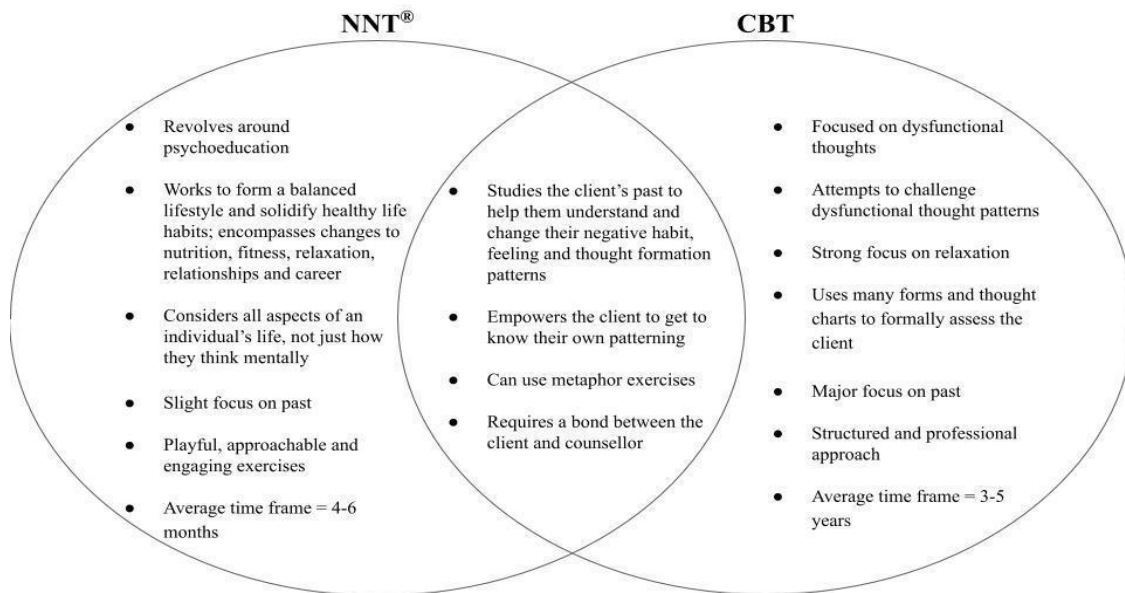


Figure 9: Comparing NNT[®] and CBT therapy models from the perspective of CFHC EHPs.

Discussion

CORE-OM Scoring

Figure 1 displays that the CFHC client mean CORE-OM score was below the clinical cut-off value provided by the tool. This indicates that post-NNT[®], CFHC clients possessed healthy-mild levels of psychological distress. This value supports the hypothesis that NNT[®] is perceived as effective by clients. Post-NNT[®], the average CFHC client experienced distress comparable to that of the general population rather than the clinical population. Individuals with low CORE-OM scores, under the clinical cut-off, would not normally seek therapy as their distress level would be manageable and impermanent. Although the survey displayed outlier CFHC clients with high CORE-OM scores in need of continuing therapy, most clients indicated that their distress was mitigated with NNT[®].

Although this finding substantiates the perceived effectiveness of NNT[®], this result is limited by the fact that pre-NNT[®] CORE-OM scores were not provided. Although it is unlikely that clients would have sought counselling if they were not distressed, there was no baseline to prove the extent of their initial distress. It is possible that the survey sample began therapy with low levels of distress and therefore it is difficult to certainly say that NNT[®] improved the scores. To resolve this limitation, it is recommended that CFHC implement the CORE-OM self-report tool into their practice. By adding this measurement of psychological distress pre- and post-NNT[®], client improvement or the lack thereof would be clear, quantifiable, and representative of the therapy's perceived effectiveness. The EHPs would be able to compare the client's CORE-OM score before and after therapy to accurately understand if the program treated them effectively. If this method was applied for each client, the organization could compile overall distributions to highlight if their model is effective towards distress.

The three CORE-OM subscale scores (well-being, problems, and functioning) for CFHC clients post-NNT[®] were below those of clients post-CBT. This indicates that CFHC clients experienced less psychological distress in these focus areas as their scores were closer to the scores of the general population. The scores for clients post-CBT were further away and higher than those of the general population, indicating that CBT clients possessed greater levels of distress after completing therapy. Therefore, the hypothesis that NNT[®] is perceived to effectively improve the behaviour, mood, and lifestyle of clients was supported. Again, this finding would be strengthened and made more accurate if pre-NNT[®] scores were available.

For both NNT[®] and CBT, clients experienced the least distress in terms of their daily functioning related to close and social relationships. This finding is supported by Figures 6 and 7 which display that CFHC clients largely agreed that they felt as though they had friends to support them and that they rarely felt humiliated or shamed by others. From this result along with Table 1, it can be inferred that both NNT[®] and CBT simultaneously improve clients' internal relationship with themselves as well as their external relationships with the people around them. This is further evidence to support the perceived effectiveness of NNT[®]. The relationship category was linked with the least amount of distress post-NNT[®], despite it being the largest contributor as to why clients initially sought counselling.

Both NNT[®] and CBT clients showed the highest and most similar CORE-OM scores in the well-being subscale. This suggests that these therapy methods have the least success improving the clients' self-feelings and optimism. This realisation is vital for organizations providing these therapy models as it indicates to them where their focus and effort should be allocated to better treat their clients. This could inspire the addition of new therapeutic exercises to strengthen clients' self-respect and positivity more specifically. It is recommended that organizations implement self-care strategies as well as positive psychology practices to reinforce positive feelings, memories, moods, and behaviours (45). Examples of self-care strategies include meditation, stretching, applying skincare and makeup products, and/or journaling.

In terms of the problems subscale, CFHC clients showed lower CORE-OM scores compared to CBT clients. This was a difference of 0.24 points between the two therapy groups. This suggests that NNT[®] more effectively treats issues related to depression, anxiety, and trauma compared to CBT. The EHP testimonies support this finding as they too indicate that clients with these issues at the beginning of NNT[®] are commonly able to improve and reduce their distress post-NNT[®]. Figures 3, 4 and 5 corroborate this inference. The majority of CFHC clients agreed that post-NNT[®], they experienced minimal tension, anxiety, panic, terror, despair, and hopelessness. Therefore, if a client in need of counselling faces issues related to depression, anxiety, and trauma, it is suggested that they engage in NNT[®]. This conclusion could be delved into more specifically with a future research project. It would be greatly beneficial to CFHC and the community as a whole to understand the effectiveness of NNT[®] in respect to depression and anxiety specifically. Currently, one in four Canadians over 18 years of age present symptoms of depression, anxiety, and trauma (46). These rates have risen substantially over the past 10 years

(47). The Centre for Addiction and Mental Health surveyed over 1000 Canadians in January 2022, and 25% of these participants indicated that they suffer with moderate-severe levels of anxiety, with 22% suffering with moderate-severe depression (48). It is clear that these illnesses are prevalent in the community and that suffering individuals are in need of effective treatment. With this research, NNT[®] appears to more successfully treat these problems compared to traditional talk therapy. If supplemental research was completed to further assess this perceived effectiveness, it would become clear if this trend is supported. If so, the community could receive the help they need to improve their mental health.

Furthermore, the community could benefit if the effect of NNT[®] was studied in a research project focusing on a target population. For example, the efficacy of NNT[®] could be measured with individuals post-incarceration. If NNT[®] benefited the lifestyle and behaviour of criminal offenders the way it did for the CFHC clients in this project, the community's recidivism rates could be lowered substantially.

Lifestyle Alterations

Post-NNT[®], clients improved the most in terms of their level of contribution to their community, their friends, and their families. This suggests that NNT[®] helps clients to move forward past their own internal issues so that they have the energy and awareness to contribute to others. The therapy allowed for the majority of CFHC clients to become at ease with their personal thoughts, moods, and behaviours so that they could extend their time and effort outwards and contribute. This sense of awareness became present in the clients who did not contribute more post-NNT[®] as well. One client stated they did not contribute more post-NNT because they were “still working on [themselves] and [were] not at the stage of contributing to [their] community or the world”. Despite the lack of change, NNT's educational framework ingrained self-awareness, acceptance, and a desire to grow in the client. Even though they remained focused on themselves, they showed awareness of the fact that they were learning and bettering themselves with the therapy. NNT[®] enabled CFHC clients to engage in deep self-reflection and self-actualization. This is what encouraged them to reach outwards and help other community members in the same state of mind that they were in pre-therapy. This demonstrates that NNT[®] effectively teaches its clients how to understand their thought patterns so that they can show a progressive growth towards self-betterment.

CFHC clients displayed the least improvement in terms of fitness post-NNT[®]. Many clients attributed this lack of change to insufficient energy and motivation. This issue could be resolved by encouraging clients to begin their fitness journey at an extremely minimal level. Clients expressed that they had good intentions to exercise, although the intention was not executed as the task of running, biking etc., seemed daunting and too energetically exhausting. If the EHPs set minimal beginning fitness goals with their clients, the task would likely appear manageable and therefore the clients would participate. This could include as small of a task as standing every hour, or performing an arm raise whilst sitting down. Gradually, the clients would see that these tasks are simple and doable and therefore they might be inclined to eventually walk outdoors or join a gym class. Although the mental benefits of this would accumulate slowly, it would still be an improvement and a step in the right direction.

When the EHPs were asked to rate the nine focus factors in terms of most improved to least improved post-NNT[®], they indicated that relationships would show the greatest improvement and contribution would show the least. Evidently, this order was misaligned with the order from the clients' perspective. The clients expressed that their level of contribution increased the most post-NNT[®] which completely contrasts the EHP opinion. This discrepancy emphasizes the need for a self-report measurement tool to be implemented at CFHC. Because no formal measurement tools are being used, the EHPs are not accurately informed as to which focus areas show the greatest advancement. It is important for this to be assessed as it will indicate which areas need to be focused on to meet client needs. The EHPs all believed that clients were improving the least in terms of contribution. This could have caused them to incorporate exercises targeted to improve this focus area in their sessions rather than others. This disconnect would result in focus areas with less improvement like fitness, relationships, and career, being overlooked. To ensure that therapy is accurately targeted and informed, it is recommended that CFHC implement a self-report measure into their practice so that client change post-NNT[®] is transparent among the client and the EHP.

Finally, the results demonstrate that NNT[®] can effectively teach clients how to communicate in an assertive manner. Clients expressed that post-NNT[®], they were able to instill boundaries around their personal and professional relationships through firm communication. This enabled the clients to develop a sense of respect for themselves so that they could realise whether they were being treated properly by their friends, family members, co-workers, and

romantic partners. The boundaries initiated the self-actualization process which enabled clients to look at their lives from a second-hand perspective. Prior to NNT[®], these clients felt lost, taken advantage of, and smothered in their relationships as they lacked the knowledge of how to communicate. NNT[®] initiated and led this progression for these clients so that post-NNT[®], they could feel at ease with their relationships.

The majority of CFHC clients stated that they sustained their positive lifestyle implementations post-NNT[®] long-term. This is an intriguing finding that would be encouraging to many community members seeking counselling. EHPs stated that on average, clients participate in NNT[®] sessions for 4-6 months to obtain positive lifestyle improvements. This is short-term compared to CBT which has an average duration of 3-5 years (49). NNT[®] therefore allows for long-term improvement in a short-term time frame. This unique characteristic would benefit clients who are seeking treatment but do not want to engage in a process that will span over multiple years. Despite the quick results, sustainability still requires diligence. The clients who sustained their positive lifestyle changes post-NNT[®] were conscientious and consistent with their new habits and routines. The proportion of clients able to sustain their results could be increased with the implementation of a self-report measure at CFHC. If client emotional health was formally measured, clients would be more likely to stay on track with their lifestyle changes. Rather than assessing the client each session, EHPs could assess the client pre- and post-NNT[®]. With this method, the client's mental blinders would remain intact during therapy and solely be removed post-therapy. A sense of responsibility would be instilled into the client while preventing the evaluation from becoming a distraction at each session. If clients knew that their final progress would be measured and assessed, they would likely be encouraged to remain diligent throughout the therapy's duration. If this level of responsibility and accountability was instilled during therapy, it would be more likely that clients would continue in the same manner post-therapy. Just as the lifestyle habits become ingrained in the clients' thought processes, the diligence could be too.

Client Emotion Distributions

The client emotion distributions pre- and post-NNT[®] support the perceived effectiveness of NNT[®]. Prior to engaging in therapy, the majority of CFHC clients were in a state of despair whilst a minimal amount related with appreciation. Post-NNT[®], 65% of clients were in a state of appreciation with no clients being in a state of despair. This indicates that the therapy sessions

successfully propelled the emotional health of most clients up the “Energy of Emotion” scale to a preferred place. Figure 8 displays that the next largest proportion of clients were in a state of frustration post-NNT[®]. The EHPs explained that because frustration is one step away from appreciation on the emotion scale, it is understandable that many clients relate with this grouping. They explained that it is not realistic for an individual to constantly live in appreciation. It is important to acknowledge that clients’ emotions do fluctuate slightly up and down, and at times, clients may relate more to frustration than appreciation. It is important that the majority of clients improve up the scale to some extent. Whether an individual moves from despair into anger, or from shame to appreciation, this movement indicates that NNT[®] was perceived as effective for the client. The proportion of clients in despair pre-NNT[®], changed to 0% post-NNT[®]. For shame, these proportions changed from 14% to 0% respectively. For guilt, 5% of clients related to this category pre-NNT[®], while only 4% did post-NNT[®]. For fear and anger the percentages changed from 12% to 0% and 7% to 4% respectively. Clearly, there was an improvement in each of these categories post-NNT[®]. This trend was mirrored for nearly all survey participants. The vast majority of clients showed movement up the emotional scale, with only a few stating that they experienced the same emotion pre- and post-NNT[®]. This supports the hypothesis that NNT[®] creates positive behaviour and mood changes for its clients.

Comparison of NNT[®] and CBT

Figure 9 displays NNT[®]’s foundation, purpose, and techniques in comparison to those of CBT. As the EHPs all possessed some form of experience with both models, this comparison can help indicate to community members which type of therapy best suits them. The results from this research project indicate that NNT[®] is perceived as effective by the majority of CFHC clients. CBT is also effective as its efficacy and success has been noted in many peer-reviewed articles. Rather than deeming one model successful and the other as ineffective, this research can be used to outline the unique characteristics of each model. By doing so, individuals with symptoms of psychological distress could choose to engage in the model that they think would best treat their distress.

While CBT is majorly focused on challenging dysfunctional thought processes linked to negative past memories, NNT[®] focuses more so on forming a balanced lifestyle with healthy habits in order to replace negative memories of the past. While NNT[®] has a slight focus on the past in order to make clients understand why they possess the feelings they do, these memories

are not dwelled upon. Rather, the EHPs consider all aspects of the client's life so that their focus is switched to implementing positive lifestyle changes that gradually fulfil the client with positive feelings of appreciation.

Both techniques empower the client to get to know their own thought patterning. To do so, CBT practitioners distribute forms and thought charts to their clients as a way of formally assessing their symptoms and unwanted habits. The clients are then given tasks to complete after their session as a form of homework that supplements the session progress. This is a rather structured and professional approach. Although many individuals find this method helpful to their emotional health, other individuals have criticised it for being too inflexible and formulaic (50). Clients have expressed that the approach can become manualized and hyper focused on pre-planned intervention techniques (50). This issue can weaken the bond between the therapist and the client which can drastically reduce the effectiveness of the model. The relationship between the client and the therapist must be dynamic and bilateral (51). Both parties must be engaged and putting forth the same level of effort in order to achieve emotional improvements (51). NNT[®] could be the solution to this issue. The clients who appreciate CBT's structured approach could continue their treatment, while those who find it unproductive could engage in NNT[®]. The basis of NNT[®] is psychoeducation; the practitioner teaches the client why they feel the emotions, experience the thoughts, and repeat habits they do. The counsellors do so in an approachable way by using playful and engaging exercises. CFHC clients explained that it was easier to remain focused on their therapeutic goals and instil the motivation needed to complete post-session tasks while using these exercises. One of these exercises is termed "The Crocodile" (11). In this exercise, the EHP teaches the client how to identify and associate the proper functions to the various parts of the brain. This enables clients to understand which areas of the brain control their decision-making abilities during times of stress. Once they are taught that the old survival brain (the crocodile) takes charge in emergent situations, they feel as though they can regain control. The clients are asked to purchase a small crocodile figurine in which they place in their pockets daily. Whenever a stressful situation arises, they can take hold of their crocodile, rationalise the situation, and then calm themselves down and move into the thinking brain to react sensibly. Because the exercise is playful, the clients are more likely to remain engaged and make it habitual practice. Because the exercises are approachable, the client can develop a stronger bond with the practitioner. When the client understands the therapeutic

process by way of psychoeducation, they are less likely to become overwhelmed and dissociated (52). This will improve the emotional health of clients more effectively.

While CBT focuses predominantly on implementing relaxation into clients' lifestyles, NNT[®] encompasses changes to nutrition, fitness, relationships, education, and career as well. If clients feel at ease with these aspects of their lifestyles, then they would be better suited for CBT. If these areas need improvement and the client is willing to make changes to their unwanted habits, then NNT[®] could greatly benefit them. A balanced and healthy lifestyle can automatically and indirectly reduce client stress to improve mental relaxation (CFHC EHP).

Finally, clients who prefer a short-term therapy time frame would be best suited to engage in NNT[®]. NNT[®] sessions last for approximately 4-6 months, while CBT can span over multiple years. This project's results indicate that even with this short time frame, NNT[®] clients were able to sustain their progress long-term. This is an encouraging factor for community members who find the multiple year commitment of CBT overwhelming. One shared limitation of both models is cost. They share a similar price with a 50 minute private session costing \$135-155 for NNT[®] and \$125-175 for CBT (53). Some CFHC clients stated that although they thoroughly enjoyed their NNT[®] sessions, they were forced to stop prior to the 4–6-month time frame due to economic constraints. As CFHC is a private fee-for-service practice, the NNT[®] program is not covered by the Ontario Health Insurance Plan. Although, as the sessions are delivered by registered psychotherapists, it is possible for sessions to be covered under clients' private insurance (through their employer for example). Although this coverage is not limitless, it could provide financial assistance to those in need of counselling. NNT[®]'s short-term time frame dually lessens the financial burden placed on clients. Rather than paying the counselling fees for multiple years, they are only necessary for the 4–6-month average time span.

Conclusion

The central purpose of this research project was to determine if NNT[®] is perceived as effective by the clients at CFHC. The results demonstrated that this alternative therapy method implemented positive change for the behaviour, mood, and lifestyle of many clients. The majority of CFHC clients experienced healthy-mild levels of psychological distress post-NNT[®]. The results indicated that the psychological distress post-therapy for NNT[®] clients was less than that of CBT clients. This suggests that NNT[®] may possess a greater ability to lessen client problems, while optimising client well-being and functioning compared to traditional therapy

models. CFHC clients demonstrated the least distress in terms of depression and anxiety post-NNT[®]. This finding should be expanded upon in a supplemental research project to test whether the trend is repeated. These trends confirm that there is a suitable measurement scale to quantify the effectiveness of NNT[®]. To validate these findings, it is recommended that CFHC implement this self-report measurement tool, CORE-OM, into their practice. This would provide the practitioners with a concrete and quantitative gauge of client improvement from the start to the completion of therapy.

This research demonstrated that with NNT[®], CFHC clients were able to implement sustainable and realistic lifestyle changes to improve their emotional health. NNT[®] enabled CFHC clients to substantially increase their frequency of contribution. Post-NNT[®], the majority of clients improved markedly in terms of their contributions to health and wellness, relationships, life balance and their community. This project also highlights that further work is needed to increase the proportion of clients who implement improved fitness habits into their lives. It is recommended that CFHC construct a gradual stepwise fitness plan for clients who lack the motivation to exercise. This plan should start with extremely subtle forms of exercise to make the fitness journey less overwhelming.

These research findings demonstrate that NNT[®] ameliorated the mood of the majority of clients. Despite most clients being in a state of despair pre-NNT[®], the majority of clients concluded therapy in a state of appreciation. The therapy successfully propelled clients up the “Energy of Emotion” scale to a more desired mood. It is because of this capability that NNT[®] is so highly recommended from the client and EHP perspective. Both parties advocate for this therapeutic alternative and suggest that the community engage in the program.

Finally, this research highlights that NNT[®] does possess benefits compared to CBT. While CBT has been proven to be effective, NNT[®] may be more suited to certain individuals in need of counselling. NNT[®] provides a more holistic, engaging, and playful approach that uses psychoeducation to treat the client. Rather than focusing on dysfunctional thoughts, NNT[®] works to improve all aspects of a client’s lifestyle. The bond between the therapist and client at CFHC is strong and dynamic due to the approachable nature of the program. Lastly, NNT[®] is short-term in comparison to traditional talk therapy which can endure for multiple years.

This project affirms CFHC’s hypothesis that NNT[®] is perceived as effective by clients. This can hopefully encourage distressed and suffering individuals in the community to try this

alternative. If more individuals engage in this program, it is possible for the emotional health of the community to be greatly improved. These findings have the potential to expand upon research in the emotional health care field. If more practitioners, psychotherapists, emotional health care organizations, and even students delve into this alternative model, they too could assess its effectiveness and potentially apply it to their practices.

References

1. McGill University. History module: the growth of new neurons in the adult human brain - 2021. https://thebrain.mcgill.ca/flash/capsules/histoire_bleu05.html. Accessed 25 Oct 2021.
2. Altman J. Are new neurons formed in the brains of adult mammals? *Sci* 1962 Mar;135(3509):1127-28. doi: 10.1126/science.135.3509.1127.
3. National Institute of Neurological Disorders and Stroke. Brain basics: the life and death of a neuron - 2019. <https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Life-and-Death-Neuron>. Accessed 25 Oct 2021.
4. Gage FH. Neurogenesis in the adult brain. *J Neurosci* 2002 Feb;22(3):612-3. doi: 10.1523/JNEUROSCI.22-03-00612.2002
5. Soiza-Reilly M, Saggau P, Arenkiel BR. Neural circuits revealed. *Front Neural Circuits* 2015 Jul;9(35):1-3. doi: 10.3389/fncir.2015.00035.
6. The University of Queensland. Queensland Brain Institute. Can you grow new brain cells - 2017. <https://qbi.uq.edu.au/blog/2017/11/can-you-grow-new-brain-cells>. Accessed 26 Oct 2021.
7. McGill University. The brain from top to bottom: the amygdala and its allies - 2021. https://thebrain.mcgill.ca/flash/i/i_04/i_04_cr/i_04_cr_peu/i_04_cr_peu.html. Accessed 25 Oct 2021.
8. Binder MD, Hirokawa N, Windhorst U. Fight-or-flight response. *Ency Neurosci* 2009. doi: 10.1007/978-3-540-29678-2_1736.
9. Lanese N. Fight or flight: the sympathetic nervous system - 2019. <https://www.livescience.com/65446-sympathetic-nervous-system.html>. Accessed 27 Oct 2021.
10. Saper CB, Lowell BB. The hypothalamus. *Curr Biol* 2014 Dec;24(25):1111-6. doi: 10.1016/j.cub.2014.10.023.
11. Sargent K. Neural Network Therapy[®] Practice Guide: neuroscience meets counselling a practical approach to emotional health care. 1st ed. Peterborough, ON: Emotional Health Practitioner Program - Canadian Family Health Counselling, 2021.
12. Arden JB. Rewire your brain: think your brain to a better life. Hoboken, NJ.: John Wiley & Sons, Inc; 2010.
13. Dudley R, Kuyken W. Formulation in cognitive behavioural therapy. New York, NY: Routledge; 2006. p.17.
14. Greimel KV, Kröner-Herwig B. Cognitive Behavioural Treatment (CBT). In: Møller AR, Langguth B, De Ridder D, Kleinjung T, editors. Textbook of Tinnitus. New York, NY: Springer; 2011.
15. Hoifodt RS, Strom C, Kolstrup N, Eisemann M, Waterloo K. Effectiveness of cognitive behavioural therapy in primary health care: a review. *Fam Prac* 2011 Oct;28(5):489-504. Doi: 10.1093/fampra/cmr017.

16. Ekbert S, Barnes RK, Kessler DS, Malpass A, Shaw ARG. Managing clients' expectations at the outset of online Cognitive Behavioural Therapy (CBT) for depression. *Health Expect* 2014 Aug;19(3):557-69. doi: <https://doi.org/10.1111/hex.12227>.
17. Ekman R, Fletcher A, Giota J, Eriksson A, Thomas B, Baathe F. A flourishing brain in the 21st Century: a scoping review of the impact of developing good habits for mind, brain, well-being, and learning. *Mind Brain Educ* 2021 Nov;16:13-23. doi: 10.1111/mbe.12305.
18. Anokhin AP, Birbaumer N, Lutzenberger W, Nikolaev A, Vogel F. Age increases brain complexity. *Electroencephalogr Clin Neurophysiol* 1996 Jul;99(1):63-8. doi: 10.1016/0921-884X(96)95573-3.
19. Peters R. Ageing and the brain. *Postgrad Med J* 2006 Feb;82(964):84-8. doi: 10.1136/pgmj.2005.036665.
20. Cramer SC, Sur M, Dobkin BH, O'Brien C, Sanger TD, Trojanowski JQ, et al. Harnessing neuroplasticity for clinical applications. *Brain* 2011 Jun;134(6):1591-609. doi: 10.1093/brain/awr039.
21. Saavedra JM. Sigmund Freud's personality theory: learning module employing computer-assisted instruction. *Nat Sci Found* 1980.
22. Sword RKM, Zimbardo P. Why reliving your trauma only goes so far - 2021. <https://www.psychologytoday.com/ca/blog/the-time-cure/201211/why-reliving-your-trauma-only-goes-so-far>. Accessed 2 Nov 2021.
23. Tanabe K. Pareto's 80/20 rule and the Gaussian distribution. *Physica A* 2018 Jul;510:635-40. doi: 10.1016/j.physa.2018.07.023.
24. Roomer J. Reclaim your focus by using the 80/20 rule (Pareto's Principle) - 2018. <https://medium.com/personal-growth-lab/reclaim-your-focus-by-using-the-80-20-rule-paretos-principle-5e2b57c16320>. Accessed 2 Nov 2021.
25. University of Colorado at Boulder. Your brain on imagination: its a lot like reality, study shows - 2018. <https://www.sciencedaily.com/releases/2018/12/181210144943.htm>. Accessed 1 Nov 2021.
26. Thirioux B, Harike-Germaneau G, Langbour N, Jaafari N. The relation between empathy and insight in psychiatric disorders: phenomenological, etiological, and neuro-functional mechanisms. *Front Psychiatry* 2020 Feb;10(966):1-18. doi: 10.3389/fpsy.2019.00966.
27. Pessoa L. A network model of the emotional brain. *Trends Cogn Sci* 2017 May;21(5):357-71. doi: 10.1016/j.tics.2017.03.002.
28. Arnsten AFT. Stress signalling pathways that impair prefrontal cortex structure and function. *Nat Rev Neurosci* 2010 Jul;10(6):410-22. doi: 10.1038/nrn2648.
29. Greenfield B. *Boundless: upgrade your brain, optimize your body and defy aging*. Las Vegas, NV.: Victory Belt Publishing Inc; 2020.
30. Oleinik A. What are neural networks not good at? On artificial creativity. *Big Data Soc* 2019 Apr:1-13. doi: 10.1177/2053951719839433.

31. Burkeman O. Why CBT is falling out of favour - 2015.
<https://www.theguardian.com/lifeandstyle/2015/jul/03/why-cbt-is-falling-out-of-favour-oliver-burkeman>. Accessed 29 Oct 2021.
32. Linn BS, Linn MW, Jensen J. Anxiety and immune responsiveness. *Psychol Rep* 1981 Dec;49(3):969-70. doi: 10.2466/pr0.1981.49.3.969.
33. Atchison M, Condon J. Hostility and anger measures in coronary heart disease. *Aust N Z J Psychiatry* 1993 Sep;27(3):436-42. doi: 10.3109/00048679309075800.
34. OQ Measures. OQ® - Analyst - 2021. <https://www.oqmeasures.com/oq-analyst-3/>. Accessed 2 Nov 2021.
35. Campbell A, Hemsley S. Outcome rating scale and session rating scale in psychological practice: clinical utility of ultra brief measures. *Clin Psychol* 2011 Jan;13(1):1-9. doi: 10.1080/13284200802676391.
36. Outcome Referrals. Top assessment - 2021.
<http://www.outcomereferrals.com/main/sub-page/category/top-assessment/top-assessment>. Accessed 3 Nov 2021.
37. Dfarhud D, Malmir M, Khanahmadi M. Happiness & health: the biological factors - systematic review article. *Iran J Public Health* 2014 Nov;43(11):1468-77.
38. McGee M. Meditation and psychiatry. *Psychiatry (Edgmont)* 2008 Jan;5(1):28-41.
39. Lorentzen V, Handegard BH, Moen CM, Solem K, Lillevoll K, Skre I. CORE-OM as a routine outcome measure for adolescents with emotional disorders: factor structure and psychometric properties. *BMC Psychol* 2020 Aug;8(86). Doi: 10.1186/s40359-020-00459-5.
40. Derogatis L. Brief symptom inventory (BSI) - 1975.
<https://hazards.colorado.edu/nhcddata/chernobyl/ChData/ScalesInstruments/Scales%20and%20Indices/Scale%20Construction%20Instructions/BSI.pdf>. Accessed 1 Nov 2021.
41. Von Below C. “We just did not get on”. Young adults’ experiences of unsuccessful psychodynamic psychotherapy – a lack of meta-communication and mentalization? *Front Psychol* 2020 Jun;11:1243. doi: 10.3389/fpsyg.2020.01243.
42. Scheid TL, Brown TN. *A handbook for the study of mental health*, 2nd edn. New York, NY.: Cambridge University Press; 2010.
43. Cahn J. Ethics Lecture - 2021. Trent University. Accessed 1 Nov 2021.
44. CORE IMS. CORE measurement tools - 2015.
https://www.coreims.co.uk/About_Core_Tools.html. Accessed 1 Nov 2021.
45. Bannink F. *Practising positive CBT: from reducing distress to building success*, 1st edn. West Sussex, U.K.: John Wiley & Sons, Ltd; 2012.
46. Statistics Canada. Survey on COVID-19 and mental health, February to May 2021 - 2021. <https://www150.statcan.gc.ca/n1/daily-quotidien/210927/dq210927a-eng.htm>. Accessed 10 Mar 2022.

47. Phillips SP. Is anxiety/depression increasing among 5-25 year olds? A cross-sectional prevalence study in Ontario, Canada, 1997-2017. *J Affect Disord* 2021 Mar;282:141-6. doi: 10.1016/j.jad.2020.12.178.
48. Centre for Addiction and Mental Health. Anxiety, feelings of depression and loneliness among Canadians spikes to highest levels since spring 2020 - 2022. <https://www.camh.ca/en/camh-news-and-stories/anxiety-depression-loneliness-among-canadians-spikes-to-highest-levels>. Accessed 10 Mar 2022.
49. Ramirez Basco M, Rush AJ. *Cognitive-behavioural therapy for Bipolar Disorder*, 2nd edn. New York, NY: The Guilford Press; 2005.
50. Haen C, Aronson S. *Handbook of child and adolescent group therapy: a practitioner's reference*. New York, NY: Routledge; 2017. p. 299.
51. Okamoto A, Dattilio FM, Dobson KS, Kazantzis N. The therapeutic relationship in cognitive-behavioural therapy: essential features and common challenges. *Prac Innov* 2019 Jun;4(2): 112-23. doi: 10.1037/pri0000088.
52. Sprich SE, Knouse LE, Cooper-Vince C, Burbridge J, Safren SA. Description and demonstration of CBT for ADHD in adults. *Cogn Behav Pract* 2010 Feb;17(1):9-15. doi: 10.1016/j.cbpra.2009.09.002.
53. Therapy Toronto. Psychotherapy fees - 2022. <https://therapytoronto.ca/fees.phtml?l=f>. Accessed 12 Apr 2022.

Articles used to obtain CBT and non-clinical population CORE-OM mean scores:

1. Blainey SH, Rumball F, Mercer L, Evans LJ, Beck A. An evaluation of the effectiveness of psychological therapy in reducing general psychological distress for adults with autism spectrum conditions and comorbid mental health problems. *Clin Psychol Psychother* 2017 Jul;24(6):1474-84. doi: 10.1002/cpp.2108.
2. Barkham M, Culverwell A, Spindler K, Twigg E. The CORE-OM in an older adult population: psychometric status, acceptability, and feasibility. *Ageing Ment Health* 2005 May;9(3):235-45.
3. Payne N, Ciclitira K, Starr F, Marzano L, Brunswick N. Evaluation of long-term counselling at a community health service for women who are on a low income. *Couns Psychother Res* 2014 Dec;15(2):79-87. doi: 10.1080/14733145.2013.877513.
4. Barkham M, Margison F, Leach C, Lucock M, Mellor-Clark J, et al. Service profiling and outcomes benchmarking using the CORE-OM: toward practice-based evidence in the psychological therapies. *J Consult Clin Psychol* 2001 Apr;69(2):184-96. doi: 10.1037/0022-006X.69.2.184.
5. Evans C, Connell J, Barkham M, Margison F, McGrath G, Mellor-Clark J, et al. Towards a standardised brief outcome measure: psychometric properties and utility of the CORE-OM. *B J Psych* 2018 Jan; 180(1).
6. Elfstrom ML, Evans C, Lundgren J, Johansson B, Hakeberg M, Carlsson G. Validation of the Swedish Version of the Clinical Outcomes in Routine Evaluation Measure

- (CORE-OM). *Clin Psychol Psychother* 2012 Mar;20(5):447-55. doi: 10.1002/cpp.1788.
7. Ashworth M, Robinson S, Godfrey E, Shepherd M, Evans C, Seed P, et al. Measuring mental health outcomes in primary care: the psychometric properties of a new patient-generated outcome measure, 'PSYCHLOPS' ('psychological outcome profiles'). *Prim Care Ment Health* 2005;3(4):261-70.

Appendix

A-1: Research Survey

Survey - *Exploring the Effectiveness of Neural Network Therapy (NNT)[®]*

(Information provided in Qualtrics survey description box)

Purpose

This 15 minute survey is being conducted for the Trent University Community-Based Research Project #5024. The project aims to test whether or not NNT[®] is an effective therapy method for clients of Canadian Family Health Counselling (CHFC). The organization solely provides this method of therapy to its clients, and therefore wants a clear understanding of its impact on client emotional health. It will be considered useful if it can create positive behavior, mood, and lifestyle changes for the clients at hand in terms of nutrition, fitness, relaxation, family, relationships, friends, education, career, and contribution. These positive changes can be seen as progressive steps to a preferred Energy of Emotion[®]. These emotional energies are measured on a scale of least desirable to most desirable. The scale starts with the feeling of despair (the least desirable) and moves to shame, guilt, fear, anger, frustration, and finally it ends with the most desirable feeling, appreciation. The therapy's goal is to gradually surge new and improved neural pathways in the brain in lieu of old and unwanted ones. Unlike in talk therapy, the focus is not on reenacting the neural pathways that are in need of correction. In NNT[®], the same chemistry will not be fired over and over to reinforce unwanted networks, rather new chemistry will be activated.

Significance

If NNT[®] is perceived to be effective, more community members will be aware of and be encouraged to try this alternative. NNT[®] could provide a secondary outlet for individuals who have not had success with traditional talk therapy and/or who want to try something unique for their mental health.

Notes

If at any time you feel uncomfortable answering these questions, you are able to withdraw from the survey. Even if you consented to participate, that does not mean that you must fill out the survey and/or send your responses back.

This survey is completely anonymous. Your name will not be linked to any of the questions. All client names will remain within CHFC. This ensures that all identities and responses are secured and protected.

Finally, if you do choose to respond, your insight will be greatly appreciated. Understanding how this therapy works for its clients will benefit the organization as well as the community at large.

Thank you!

(First survey question)

By selecting **Yes**, you confirm that you are **over the age of 16** and have read and agreed to the **Informed Consent Waiver** provided in the email. Please note that if you feel uncomfortable answering these questions at any time, you are able to withdraw from participating.

(If No is selected, the survey will be discarded)

- Yes
- No

Part 1 - CORE-NR questionnaire (CORE-OM with risk questions omitted)

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IMPORTANT - PLEASE READ THIS FIRST

This form has 28 statements about how you have been OVER THE LAST WEEK. Please read each statement and think how often you felt that way last week. Then tick the box which is closest to this.

Over the last week...	Not at all	Only occasionally	Sometimes	Often	Most or all the time
1. I have felt terribly alone and isolated					
2. I have felt tense, anxious or nervous					
3. I have felt I have someone to turn to for support when needed					
4. I have felt O.K. about myself					
5. I have felt totally lacking in energy and enthusiasm					
6. I have felt able to cope when things go wrong					
7. I have been troubled by aches, pains, or other physical problems					
8. Talking to people has felt too much for me					
9. Tension and anxiety have prevented me doing important things					
10. I have been happy with the things I have done					
11. I have been disturbed by unwanted thoughts and feelings					
12. I have felt like crying					

13. I have felt panic or terror					
14. I have felt overwhelmed by my problems					
15. I have had difficulty getting to sleep or staying asleep					
16. I have felt warmth or affection for someone					
17. My problems have been impossible to put to one side					
18. I have been able to do most things I needed to					
19. I have felt despairing or hopeless					
20. I have felt criticized by other people					
21. I have thought I have no friends					
22. I have felt unhappy					
23. Unwanted images or memories have been distressing me					
24. I have been irritable when with other people					
25. I have thought I am to blame for my problems and difficulties					
26. I have felt optimistic about my future					
27. I have achieved the things I wanted to					
28. I have felt humiliated or shamed by other people					

THANK YOU FOR YOUR TIME IN COMPLETING THIS QUESTIONNAIRE

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Part 2

Please provide a brief written/point-form response to the following questions.

Reminder: All responses are anonymous. You may move past any questions you do not wish to answer.

1. If you feel comfortable, could you please explain why you sought persistent and ongoing emotional counselling?
2. Before starting Neural Network Therapy® which of the emotions listed below did you relate with most/feel most frequently on a daily basis? What specifically made you feel this way?

Despair, shame, guilt, fear, anger, frustration, appreciation

3. After working through the NNT® exercises, how has your nutrition changed for the better or for the worse? What new foods have you implemented into your diet post-therapy?
4. Have you made any changes to your fitness routine as you've progressed through therapy? If yes, what activities are you partaking in on a daily basis that you did not do prior to NNT®?
5. What is your daily routine to soothe your mind? Did you do these activities before engaging in NNT®?
6. Has your participation in NNT® caused an impact on the people in your close environment whether that be your family, close friends, colleagues? If yes, how is this impact noticeable?
7. Do you find the type of person you are attracted to has changed after completing NNT®. Has your relationship(s) changed, and if so how? Do you feel content in your relationship or does it often bring you down?
8. At the end of the day do you often feel mentally and physically drained? Do you feel as though you have endless tasks while others do not?
9. How has your mental diet changed from pre- to post-therapy? What new books, movies, tv shows, or educational outlets do you focus attention on most now?
10. How do you actively separate work from your personal life? Did you do this before NNT®?
11. What contributions to your family, community, or the world have you made in the past month? How did this make you feel?
12. What NNT® exercise did you find the most helpful/impactful?
13. Do you feel as though maintaining your new lifestyle change is sustainable and realistic, or does it feel overwhelming as though you are easily drawn back to your old habits?
14. Upon reflection on your therapy journey, would you recommend it as a tool for others? What emotion do you relate the most with now?

Despair, shame, guilt, fear, anger, frustration, appreciation

Thank you very much for taking the time to complete this survey. The data collected will have a great impact on your community.

(End of survey)

A-2: Survey Email

Subject Line: Canadian Family Health Counselling wants your feedback!

Email Body:

Hello!

As a client of Canadian Family Health Counselling, you have been selected to participate in a survey for Undergraduate research at Trent University. This survey is part of the community based research project #5024: Exploring the Effectiveness of Neural Network Therapy®. The 15 minute survey aims to test how effective NNT® is in the opinions of CFHC clients. The organization solely provides this method of therapy, and therefore wants to assure its quality and impact on client emotional health in terms of behavior, mood, and lifestyle changes.

If NNT® is perceived to be effective, more community members will be aware of and be encouraged to try this alternative. NNT® could provide a secondary outlet for individuals who have not had success with traditional talk therapy and/or who want to try something unique for their mental health. Your insight will be greatly appreciated and highly impact the community.

The survey is completely voluntary and anonymous. Your name will not be linked to any of the responses, nor will it move outside of CFHC as it is secured and protected. This research in no way will affect your client care. If you do not wish to complete it, please disregard this email. If you do wish to contribute, please read the Informed Consent Waiver provided below and click the survey link to respond. By choosing to fill out the survey you are consenting to participate.

Below is the **Informed Consent Waiver**.

Informed Consent Waiver

Research Project Title: *Exploring the Effectiveness of Neural Network Therapy®*

The survey will take approximately 15 minutes. We do not anticipate any risks associated with your participation, but you have the right to withdraw from the research at any time. Please review the information provided above for further insight into the project. To ensure anonymity, your name will remain within Canadian Family Health Counselling and be anonymized in the survey platform.

Thank you for agreeing to be surveyed as part of Project #5024. Ethical procedures for academic research undertaken from Trent University require that participants explicitly provide consent to responding and allow for their responses to be used as data in the final report. This consent form is necessary for us to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation.

Would you therefore read the accompanying information to certify that you approve of the following:

- The survey will be anonymous.
- You may withdraw at any time.
- The responses of your survey will be used and analyzed by the researcher as data for the final report.
- Access to the survey responses will be limited to the researcher and reviewer.
- Any variation of the conditions above will only occur with your explicit approval.

The information you provide in your survey may be used in:

- The final research report and poster
- Academic papers

By reading and selecting **YES** in Survey Question 1, I agree that:

1. My participation in this project is voluntary.
2. I can stop taking part in the research and withdraw my information at any point.
3. Information you provide may be quoted directly (as surveys are anonymous).
4. I will not be receiving any compensation for involvement in this research.
5. I have read and agreed to the Informed Consent Waiver and the Information Document (email).

Thank you very much for taking the time to read this email and considering participating in the survey. Again, those who wish to participate can click the link to open the survey. The first survey question will confirm your agreement to the waiver. You will have 3 weeks to complete the survey.

Thank you, your time and opinions are greatly appreciated!

Best,
CFHC

A-3: Google Spreadsheet with CORE-OM survey scores

Participant ID	Total Score	Survey Mean	Subjective Well	Problems Score	Functioning Score	W mean	P mean	F mean
R_2veM9yhFCM	62	2.21	12	27	23	3	2.25	1.92
R_2CdXZyIVyNF	56	2	9	24	23	2.25	2	1.92
R_2Y3sARKp2Tt	39	1.39	6	24	9	1.5	2	0.75
R_3Hw7272YWH	42	1.5	9	15	18	2.25	1.25	1.5
R_RW5yIyaZvhA	16	0.57	2	7	7	0.5	0.58	0.58
R_2wldwPGuxRt	37	1.31	7	16	14	1.75	1.33	1.17
R_2xCXNP3wld4	38	1.36	6	16	16	1.5	1.33	1.33
R_32PyE7kdw\	14	0.5	1	10	3	0.25	0.83	0.25
R_2q4MMdZnV2	73	2.61	11	34	28	2.75	2.83	2.38
R_3JF3Xmd4bLr	43	1.54	7	16	20	1.75	1.33	1.67
R_2lb4Nv7VBJTt	72	2.57	14	34	24	3.5	2.83	2
R_3fuWilhm81G	27	0.96	1	16	10	0.25	1.33	0.83
R_1Nn7AepETRV	33	1.22	6	14	13	1.5	1.17	1.18
R_1Q6J3tQazlpl	7	0.25	0	7	0	0	0.58	0
R_OvuomAP4lqf	49	1.75	10	23	16	2.5	1.92	1.33
R_3RjFKFXHb2t	51	1.82	6	24	21	1.5	2	1.75
R_BfBMJr2NV2y	54	1.93	10	25	19	2.5	2.08	1.58
R_2y7Vj95jorkEv	4	0.15	0	4	0	0	0.36	0
R_2tEv36RROm	28	1	3	15	10	0.75	1.25	0.83
R_3imQz23PrKH	53	1.89	8	23	22	2	1.92	1.83
R_T0ISEIXDsZLI	52	1.86	9	22	21	2.25	1.83	1.75
R_3LYDpkAhly9t	32	1.14	5	18	9	1.25	1.5	0.75
R_24MooCzYxq	21	0.75	3	7	11	0.75	0.58	0.92
R_2rvCuxGSgZE	44	1.57	8	20	16	2	1.67	1.33
R_IDOVK0nQDL	10	0.36	0	5	5	0	0.42	0.42
R_2yedigqO4fGr	7	0.25	0	4	3	0	0.33	0.25
R_vPOCT8VIfyp	13	0.46	1	5	7	0.25	0.42	0.58
R_e4FquG2B2ot	10	0.36	2	2	6	0.5	0.17	0.5
R_2ANobjlDOVE	48	1.71	10	2	14	2.5	2	1.17
R_1EBzGgi2EZA	35	1.25	5	18	12	1.25	1.5	1
R_2cpGjicDfKCj	29	1.04	8	12	9	2	1	0.75
R_1LvPOlhtTvW7	63	2.25	13	28	22	3.25	2.33	1.83
R_1mwsPPfOnIF	58	2.07	11	27	20	2.75	2.25	1.67
R_1LqckJSOgplin	54	1.93	6	24	24	1.5	2	2
R_udCju8FZ2ZIl	69	2.65	10	26	33	3.33	2.36	2.75
R_pzNXluc3ulb8	91	3.25	16	41	34	4	3.42	2.83
R_dotxiDOs6ii2L	9	0.32	2	4	3	0.5	0.33	0.25
R_3KLGw5i4k7rt	38	1.36	9	14	15	2.25	1.17	1.25
R_r8WoDvp2tg6i	81	2.89	13	38	30	3.25	3.17	2.5
R_3dWaiKITnqhL	13	0.46	2	4	7	0.5	0.33	0.58
R_urEqWjjBKDV	33	1.18	6	15	12	1.5	1.25	1
R_2SIDMPJUEgs	24	0.86	6	11	7	1.5	0.92	0.58
OVERALL MEAN	38.85714286	1.392857143	6.5	17.16666667	14.66666667	1.644761905	1.479047619	1.225238095
CLINICAL CUT-OFF = 1.43								
Client mean score 0-1	1.1 - 2	2.1-3	3.1-4					
Number of clients	14	20	7	1	42 samples total			